REFERENCE GUIDE

Controlling VARI*LITE® Equipment Using a DMX512 Console

DMX software version 5.4

Series 200™

Series 300™

Luminaires

Power Devices

Interface Devices

PRG LIGHTING

02.3004.0300.54

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DMX512 Reference Guide
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Safety Notice

It is extremely important to read ALL safety information and instructions provided in this manual and any accompanying documentation before installing and operating the products described herein. Heed all cautions and warnings during installation and use of this product. Safety symbols used throughout this manual are as follows:

CAUTION advising of potential damage to product.

WARNING advising of potential injury or death to persons.

GENERAL INFORMATION PERTAINING TO PROTECTION AGAINST ELECTRICAL SHOCK, FIRE, EXPOSURE TO EXCESSIVE UV RADIATION, AND INJURY TO PERSONS CAN BE FOUND BELOW.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST FIRE

1. Luminaires have been designed for use only with specific lamps. Note lamp type before replacing. Installing another type of lamp may be hazardous.
2. Luminaires may be mounted on any type of surface as long as mounting instructions are followed. See instructions detailed in this manual.
3. Replace fuses with same type and rating only.
4. Minimum distance from head to any flammable object is 2m.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST ELECTRICAL SHOCK

1. Luminaires are designed for dry locations only. Exposure to rain or moisture may damage luminaire.
2. Disconnect power before servicing any equipment.
3. Servicing to be performed by qualified personnel only.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST EXPOSURE TO EXCESSIVE ULTRAVIOLET RADIATION

1. Luminaires may use an HID type lamp which produces UV radiation. DO NOT look directly at lamp.
2. It is hazardous to operate luminaires without complete lamp enclosure in place or when lens is damaged. Lenses or UV shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired.

WARNING: INSTRUCTIONS FOR PROTECTION AGAINST INJURY TO PERSONS

1. Exterior surfaces of the luminaire will be hot during operation. Use appropriate safety equipment (gloves, eye protection, etc.) when handling and adjusting hot equipment and components. Service and maintenance should be performed only by qualified personnel as determined by the high pressure lighting fixture manufacturer.
2. Arc lamps generate intense heat. Disconnect power and allow lamp to cool for 15 minutes before relamping.
3. Arc lamps emit ultraviolet radiation which can cause serious skin burn and eye inflammation. Additionally, arc lamps operate under high pressure at very high temperatures. Should the lamp break, there can exist a danger of personal injury and/or fire from broken lamp particles being discharged.
4. The lamp shall be changed if it has become damaged or thermally deformed.
5. Wear eye protection when relamping.
6. If lamp is touched with bare hands, clean lamp with denatured alcohol and wipe with lint-free cloth before installing or powering up the luminaire.
7. Serious injury may result from the generation of ozone by this lamp system. A proper means of venting must be provided.

Revision History

This manual has been revised as follows:

Version	Release Date	Notes
BASIC	April 16, 2008	Initial release for DMX software version 5.4 Note that this manual was converted to the PRG format from a legacy VARI✳LITE® manual.

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Introduction

About This Manual

This manual contains instructions for installing and operating VARI✻LITE® Series 200™ and Series 300™ lighting equipment within a DMX512-controlled system.

Familiarizing yourself with this information will help you get the most out of your lighting system.

WARNING: It is important to read ALL accompanying safety and installation instructions to avoid damage to the product and potential injury to yourself or others.

Additional Documentation

Note that the products covered in this manual are serviced and maintained by Production Resource Group (PRG). All questions and inquiries regarding the items cover in this manual should be directed to your PRG representative. Refer to "Customer Service" on page 4.

For additional information about the equipment covered in this manual, refer to the following PRG manuals:

- VARI✻LITE® Series 200™/300™ System Installation and Checkout Manual (02.3004.0200)
- VARI✻LITE® Interface Devices Service Manual (02.5014.0010)
- VARI*LITE® Series 200™ ACS Equipment Service Manual (02.5006.0010)
- VARI✻LITE® Series 300™ Modular Rack Service Manual (02.9640.0010)
- VARI✻LITE® Series 300™ Single Channel Controller Service Manual (02.9640.0011)
- VARI✻LITE® DMX Power Pack Service Manual (02.9654.0010)

For more information regarding DMX512 systems, refer to the DMX512/1990 & AMX 192 Standards publication available from United States Institute for Theatre Technology, Inc. (USITT).

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  Syracuse, NY 13206-1111 USA
  1-800-93USITT
  www.usitt.org

Equipment Covered

Series 200 Equipment

Series 200™ luminaires require a DMX200 Interface in order to accept DMX512 protocol.

Product	Part Number
VL2B™ Spot Luminaire	20.5002.0004
VL2C™ Spot Luminaire	20.9637.0001
VL4™ Wash Luminaire	20.8628.0001
DMX200 Interface	20.9623.0551
Series 200™ Lamp Cable	25.7030.XXXX *
Series 200™ Trunk Cable	25.7029.XXXX *
Series 200™ Super Lamp Cable	25.7095.XXXX *

Series 300 Equipment

Series 300™ luminaires require a Smart Repeater™ Interface in order to accept DMX512 protocol.

Product	Part Number
VL5™ Wash Luminaire	20.9634.0001
VL5Arc™ Wash Luminaire	20.9647.0001
VL5B™ Wash Luminaire	20.9634.0201
VL6™ Spot Luminaire	20.9638.0001
VL6B™ Spot Luminaire	20.9660.0001
VL6C™ Spot Luminaire	21.9674.0007
VL6C+™ Spot Luminaire	20.9674.0002
VL7™ Spot Luminaire	20.9650.0001
VL7U™ Spot Luminaire	20.9650.7000
VL7B™ Spot Luminaire	28.9650.0040
VLM™ Moving Mirror	20.9643.0001
Smart Repeater™	20.9623.0011
Smart Repeater™ Plus	20.9623.0600
DMX Power Pack	20.9654.0001
DMX Power Pack Plus	20.9654.0002
Modular Power Distribution Rack	20.9640.0001
SixPack Chassis	21.9640.0021
APS6™ Power Supply Module	21.9640.0022
C3™ Dimmer Module	20.9640.0350.02
SPC-36™ SixPack Controller	20.9640.0201
Series 300™ Unshielded Lamp Cable	25.7040.XXXX *
Series 300™ Sheilded Lamp Cable	25.7042.XXXX *
Series 300™ Smart Lamp Run Cable	25.7155.XXXX *
APS™ Trunk Cable	25.7043.XXXX *

* Last four digits represent cable length.

Cable/Connector Terminology

This manual uses American wire gauge (AWG) measurements when describing cables and connectors. For use in countries outside the U.S., or for assembling compatible cables, consult the AWG/Metric Conversion Table given below for the appropriate metric equivalent.

AWG	Metric	Max Rated Current
2/0	67.5 mm^2	225A
8/5	8.37 mm^2 (5 x 6.0 mm^2)	35A

CAUTION: Although maximum rated currents are 225A and 35A, we recommend that continuous operating current does not exceed 150A and 20A respectively.

Other common terms used when describing cables and/or connectors are as follows:

Term	Definition
plug	male connector
receptacle	Female connector
Hubbell® connector	five-pin, three phase connector (8/5)
Epic® connector	six-pin, three phase connector (8/5)
Cam-Lok® connector	single pole connector (2/0)

European mains cable sizes [single core rubber insulation (HO-7RN-F)] are measured in cross-sectional square millimeters. Commonly available sizes are 35 mm^2 (~150 Amp), 70 mm^2 (~250 Amp), and 95 mm^2 (~300 Amp).

Customer Service

Our comprehensive technical services department ensures you get the full benefit of being a PRG customer. Whether your needs are simple or complex, our full-time staff of experienced professionals are on-hand to provide support. For assistance, contact your nearest PRG office:

PRG Dallas (International Service)
8617 Ambassador Row, Suite 120
Dallas, Texas 75247
Ph: 1.214.630.1963
Fx: 1.214.630.5867
Service Fx: 214.638.2125
Service Email: orders@prg.com

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Las Vegas, Nevada 89118
Ph: 1.702.942.4774
Fx: 1.702.942.4775

PRG Los Angeles
9111 Sunland Blvd.
Sun Valley, California 91352
Ph: 1.818.252.2600
Fx: 1.818.252.2620

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8351 Eastgate Blvd.
Mount Juliet, Tennessee 37122
Ph: 1.615.834.3190
Fx: 1.615.834.3192

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North Bergen, New Jersey 07047
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Fx: 1.201.758.4312

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Phone: 1.407.855.8060
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Greenford, Middlesex, UB6 8PW
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For additional resources and documentation, please visit our website at: www.prg.com

1. System Operation

This chapter contains operation information and instructions.

- **Theory of Operation**
- **DMX512 Modes and Patching**
- **Equipment Power Requirements**

Theory of Operation

System Overview

Refer to Figure 1-1 on next page.

Series 200 Components

VARI✻LITE® Series 200™ luminaires can be controlled with DMX512 protocol using a DMX200 interface unit. The DMX200 interface converts DMX512 protocol to Series 200 comm in order to control these luminaires. The Series 200 ACS rack provides power to Series 200 luminaires through Repeater units.

Spot luminaires: VL2C™

Wash luminaires: VL4™

Communication protocol: DMX512 via DMX200 unit

Lamp power: internal

Power: AC power from ACS rack

Series 300 Components

VARI✻LITE® Series 300™ luminaires are controlled from a DMX512 console via the Smart Repeater™ unit or DMX Power Pack, which converts DMX512 protocol to the VARI✻LITE protocol required to operate the luminaires. The Smart Repeater unit can be used to distribute power and data to multiple luminaires while the DMX Power Pack will only operate a single luminaire.

Series 300 data, 24Vdc, and lamp power are provided by Smart Repeater units to Series 300 luminaires via lamp cables. Dimming power for VL5™/VL5B™ luminaires is provided by conventional lighting dimmers, conventional dimmers or by C3™ power supply modules, which require the use of an SPC-36™ controller. Arc power for VL5Arc™/VL6™/VL7™ luminaires is provided by APS6™ power supply modules. The SPC-36 controller is optional for controlling APS6 modules.

Spot luminaires: VL6™, VL6B™, VL6C™/VL6C+™, VL7™, VL7U™, VL7B™, VL7UB™

Wash luminaires: VL5™, VL5Arc™, VL5B™

Other: VLM™ moving mirror

Communication protocol: Virtuoso® or DMX512 via Smart Repeater unit

Lamp power: external via dimmer, APS6 module or C3 module

Power: DC power from Smart Repeater unit

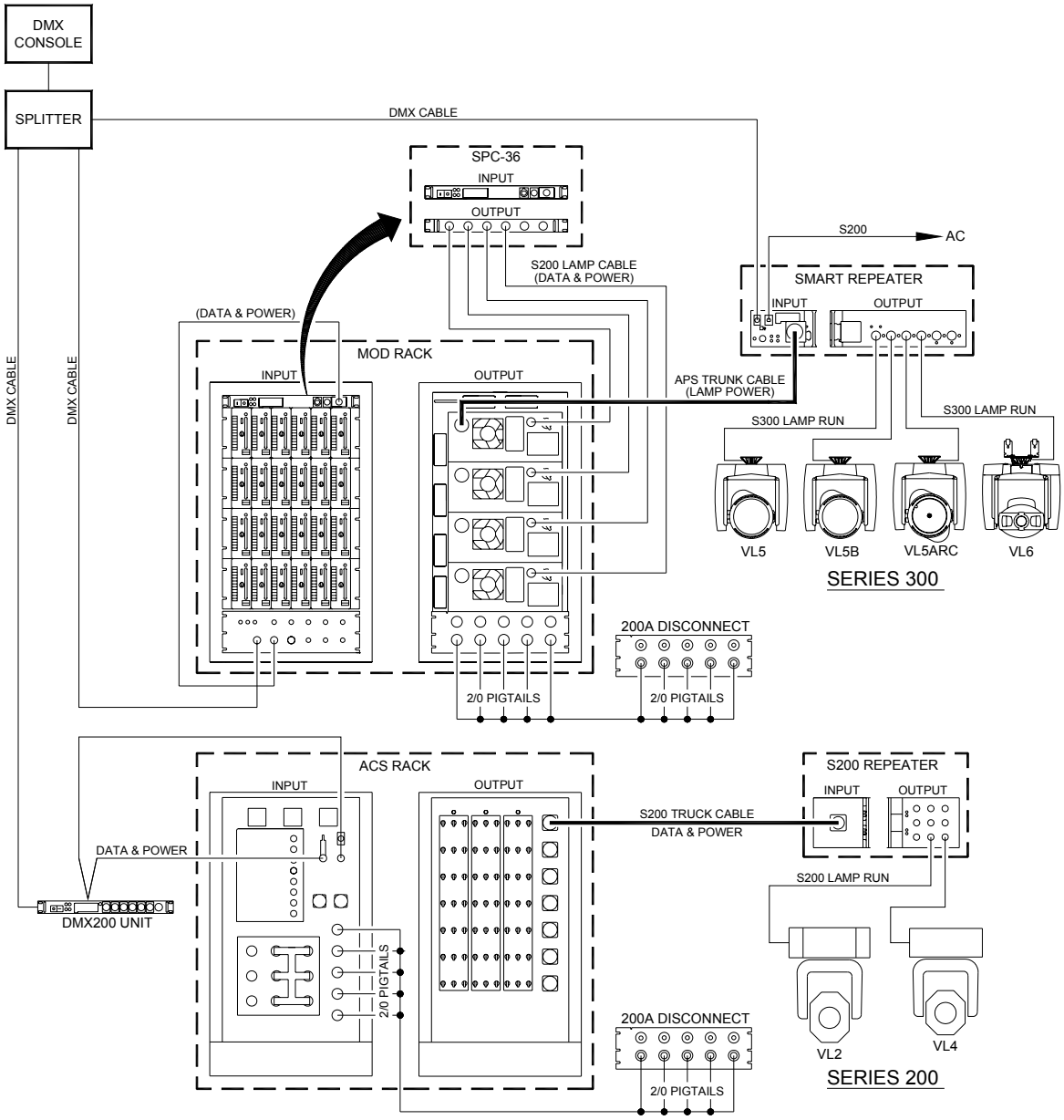


Figure 1-1: DMX512 System Example

AC Service

Note: Refer to "Cable/Connector Terminology" on page 3 for appropriate metric equivalents for cables.

Power for operation of VARI*LITE® Series 200/300 systems is provided by local house AC services or generators. The system can operate on voltages ranging from 85-260 VAC either single or three phase, 50 or 60 Hz. In some countries, a Bucking Transformer is required to step down (or up) voltages where voltage is too high, low, or unstable for the system.

To connect the VARI*LITE Series 200/300 system to the AC service, 2/0 or 8/5 mains power cables are used. These cables (five wires) are connected to the service by a qualified electrician who is usually provided by the venue. There are two types of cables available: 2/0 and 8/5 (depending on the type of equipment being used) power tails. Tails are normally 10 feet in length. An AC line disconnect or mini-AC line disconnect (30A for 8/5, 200A for 2/0) is attached to the other end of the tails to provide circuit breaker protection. Additional lengths of 2/0 or 8/5 feeder cable (20 or 80 feet) can be connected to the output of the line disconnect to provide extension of the service.

Console Types

DMX512 consoles can be broken down into two primary types: fixture-library based and channel based. Occasionally, a VARI*LITE Series 200/300 system will be controlled by an architectural lighting controller. Please consult with a dealer or manufacturer for specific instructions for your architectural control device.

Note: This is a reference guide for the VARI*LITE Series 200/300 portion of your system only. For specific storing syntax, cue playback options, or other board commands, refer to the manual that came with your specific console.

Fixture-Library Consoles

Current state-of-the-art DMX512 consoles are software-based desks that control automated luminaires and conventional fixtures, as well as any other DMX512 devices (fogger, strobe, color scroller, etc.) in a lighting system. The advantage of a fixture-library console is that the manufacturer has "done the hard work" by creating libraries of automated fixtures and devices that the console recognizes. The properties of each device are stored in a "library," and can be patched using the identification method of the console being used.

Consider using a 16-bit compatible console for very smooth movement. For even smoother response, be prepared to use a software mode that provides timing channels, see "DMX512 Modes and Patching" on page 10. This will cause the luminaires to perform much as they do under Vari-Lite protocol. You will find complete information on timing channels and how to use them in "Luminaire Timing Channels" on page 16.

Channel Based Consoles

Older DMX512 consoles were never specifically designed to control automated luminaires of any type. These consoles typically operate in an 8-bit environment. If you are using one of these consoles, consider using the timing channels offered in Modes 2, 4, 6, 8 and 10 in our DMX 5.2 software. You will find complete information on timing channels and how to use them in "Luminaire Timing Channels" on page 16.

DMX512 Modes and Patching

DMX512 Modes

Series 300 Smart Repeater

There are 10 software modes available for use in the Smart Repeater or Smart Repeater Plus units, allowing optimized control options for your lighting system. Following are brief descriptions of the modes and how to access them. If more information and assistance is required, consult an Account Manager, Dealer or Product Support Technician.

Note: It is possible to have multiple modes in a single system, but not on a single Smart Repeater unit.

Mode 1 **8-bit Mode with Reset** - Supports the VL5, VL5B and VL5Arc wash luminaires, the VL6 spot luminaire, and the VLM unit. To set Mode 1, set the thumb wheel to 901. Mode 1 uses one DMX512 channel for each parameter, plus a reset channel; therefore, each luminaire output port requires 8 channels for a total of 48 channels per Smart Repeater unit.

Mode 2 **Extended 8-Bit Mode** - Supports all of the functions of Mode 1, and adds three timing channels for beam, color and focus parameters, mini-stepping for VL6 wheels and the reset channel. To set Mode 2, set the thumbwheel to 902. Mode 2 requires 11 channels per luminaire output port for a total of 66 channels per Smart Repeater unit.

Mode 3 **16-Bit with Reset** - Supports the above luminaires and functions, but uses two channels for pan (coarse and fine) and two channels for tilt (coarse and fine). To set Mode 3, set the thumbwheel to 903. Mode 3 requires 10 channels per luminaire output port for a total of 60 channels per Smart Repeater unit.

Mode 4 **Extended 16-Bit** - Supports all of the functions of Mode 3, and adds three timing channels for beam, color and focus parameters. To set Mode 4, set the thumbwheel to 904. Mode 4 requires 13 channels per luminaire output port for a total of 78 channels per Smart Repeater unit.

Mode 5 **16-Bit with Reset** - Supports all of the functions of Mode 3, but adds support for the VL6B and VL6C/VL6C+ luminaires, and a strobe channel for the VL6 luminaire. To set Mode 5, set the thumbwheel to 905. Mode 5 requires 14 channels per luminaire output port for a total of 84 channels per Smart Repeater unit.

Mode 6 **Extended 16-Bit** - Supports all of the functions of Mode 4, but adds support for the VL6B and VL6C/VL6C+ luminaires, and a strobe channel for the VL6 luminaire. To set Mode 6, set the thumbwheel to 906. Mode 6 requires 17 channels per luminaire output port for a total of 102 channels per Smart Repeater unit.

Mode 7 **16-Bit with Reset** - Supports all of the functions of Mode 5, but adds support for the VL7 luminaire. To set Mode 7, set the thumbwheel to 907. Mode 7 requires 17 channels per luminaire output port for a total of 102 channels per Smart Repeater unit.

Mode 8 **Extended 16-Bit** - Supports all of the functions of Mode 6, but adds support for the VL7 luminaire. To set Mode 8, set the thumb wheel to 908. Mode 8 requires 20 channels per luminaire output port for a total of 120 channels per Smart Repeater unit.

Mode 9 **16-Bit with Reset** - Supports all of the functions of Mode 7, but adds support for the VL7B luminaire. To set Mode 9, set the thumbwheel to 909. Mode 9 requires 24 channels per luminaire output port for a total of 144 channels per Smart Repeater unit.

Mode 10 **Extended 16-Bit** - Supports all of the functions of Mode 8, but adds support for the VL7B luminaire. To set Mode 10, set the thumbwheel to 910. Mode 10 requires 27 channels per luminaire output port for a total of 162 channels per Smart Repeater unit.

Setting Smart Repeater Operating Mode

Setting or changing the mode of Smart Repeater or Smart Repeater Plus units is quick and easy.

To set the mode:

Step 1. With no signal applied (VARI✻LITE or DMX512), set thumbwheel to mode number you have chosen (1-10).

Step 2. Apply power to Smart Repeater or Smart Repeater Plus unit (plug it in). After a moment, a number from 1-9 or the letter "A" (hexadecimal 10) will be seen in the seven-segment display. Your mode is now set, and will stay that way until it is reassigned.

Note: The mode is stored in a battery backed-up RAM in the Smart Repeater unit. A dead battery may cause the Smart Repeater to revert to the default mode (Mode 4) on power-up.

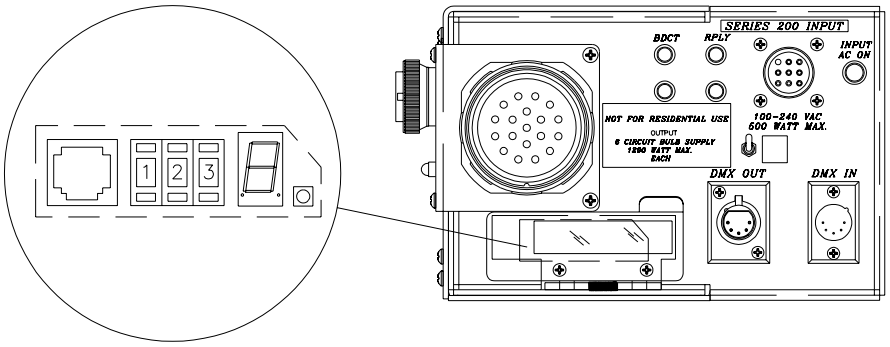


Figure 1-2: Smart Repeater Side View

Remember that you may have multiple modes in your system. Modes 5 and 6 add support for the VL6B and VL6C/VL6C+ luminaires, while Modes 7-10 add support for the VL7 and VL7B spot luminaires. These modes will support other Series 300 luminaires plugged into a Smart Repeater Plus unit by blocking out the number of channels required for VL7 or VL7B spot luminaires. This must be taken into account when patching fixtures plugged into this device. Once the mode is set, re-address the Smart Repeater/Smart Repeater Plus unit and apply signal. The seven-segment display will alternately flash the letter "d" and the mode number. The "d" signifies that the Smart Repeater unit is operating using a DMX512 operating system. (The "d" will only appear once a DMX512 signal has been received.)

Note: When no data is being received, the Smart Repeater unit will flash a "0" and the mode number.

Series 300 DMX Power Pack

When power is applied to the DMX Power Pack, the unit detects which luminaire is connected. A four-position switch on the front panel is used to select the mode.

- Modes 1-4: operate VL6, VL5, VL5B, VLM and VL5Arc luminaires.
- Modes 5 and 6: operate VL6B luminaires.
- Modes 7 and 8: operate VL7/VL7U luminaires.
- Modes 9 and 10: operate VL7B/VL7UB luminaires.

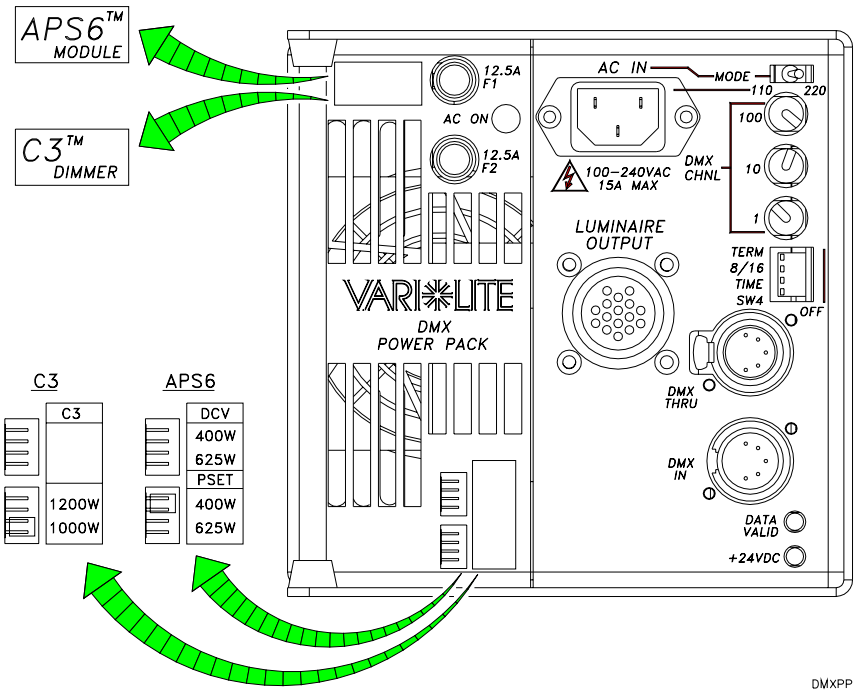
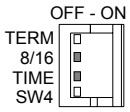
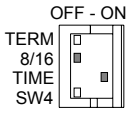
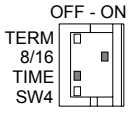
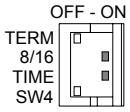
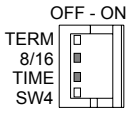
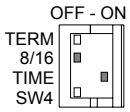
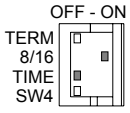
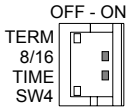


Figure 1-3: DMX Power Pack (DPP)

Note: The TERM and SW4 switch settings do not effect the DMX512 mode.

Mode Setting Table for the DMX Power Pack

The following table illustrates the correct switch settings for Modes 1-10:

Mode Number	Channels Required	Switch Setting	DMX Power Pack Version
1	8		Operates VL5, VL5Arc, VL5B, VL6, and VLM luminaires in 8-bit mode.
2	11		Operates VL5, VL5Arc, VL5B, VL6, and VLM luminaires in 8-bit extended mode.
3	14		Operates VL5, VL5Arc, VL5B, VL6, VL6B, VL6C/VL6C+ and VLM luminaires in 16-bit mode.
4	17		Operates VL5, VL5Arc, VL5B, VL6, VL6B, VL6C/VL6C+ and VLM luminaires in 16-bit mode.
5	N/A	N/A	Modes not supported.
6			
7	17		Operates VL7/VL7U luminaires.
8	20		Operates VL7/VL7U luminaires in extended mode.
9	24		Operates VL7B/VL7UB luminaires.
10	27		Operates VL7B/VL7UB luminaires in extended mode.

Thumbwheel Addresses

All VARI✳LITE® Series 200 luminaires, Smart Repeater units, and interface boxes have a three-digit thumbwheel address switch. The address set on this thumbwheel sets the starting address for the device. Under VARI✳LITE protocol, these addresses may not duplicate or overlap. Series 200 luminaires must be set to their DMX512 starting address, but no two luminaires may overlap addresses or use the same starting address when controlled by the same ACS rack.

Since VARI✳LITE Series 300 luminaires do not have physical thumbwheel switches, their thumbwheel address is determined by the port connection at their respective Smart Repeater unit. The thumbwheel address set on the Smart Repeater unit sets the starting DMX512 address for the first port on the unit. Each successive port's starting address and the number of DMX512 addresses allocated to each port depends on the Smart Repeater unit's mode. Thumbwheel addresses on Smart Repeater units controlled by DMX512 may duplicate and overlap, but this is not recommended.

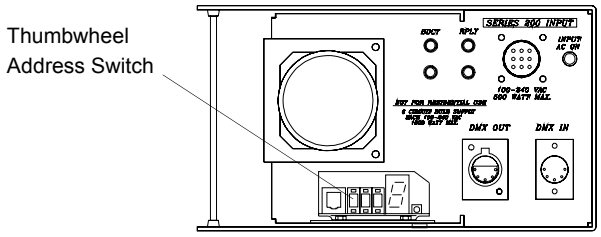


Figure 1-4: Smart Repeater Thumbwheel Switch

Patching

Patching A Fixture Library Console

Each automated luminaire is generally given a fixture number. Most operators have created their own system for numbering the luminaires in their system. An example would be to number the fixtures consecutively from downstage right working across each truss or batten, then moving upstage and back to stage right to the next position and continuing the process. This numbering system is generally based on the fixture's position in the system and makes numeric sense. Alternately, each type of fixture can have a number in a range; all the VL5 wash luminaires start with 100, the VL6 spot luminaires with 200, etc. This numbering system is not necessarily based on the fixture's position in the lighting system. The United States Institute for Theatre Technology (USITT) has also established a methodology for numbering the fixtures in a lighting system; please consult their literature for the specifics of this method. Decide upon a numbering system and then begin to patch.

Patching will pair the fixture number and the DMX512 address to a control channel. When patching a VL5 or VL5B wash luminaire, do not forget to patch dimmer channel to the intensity control channel for the fixture. For example, to patch four VL5 wash luminaires, you would note the thumbwheel address of the Smart Repeater unit, decide on a control channel number, then patch this at the console using the appropriate syntax. Remember to take into account which DMX512 universe is chosen; control problems can occur if the patching does not occur in the proper universe. Many consoles currently can have up to four DMX512 universes, each with 512 channels.

At this point, continue to patch the fixtures and other DMX512 devices until the show is patched. It is often a good idea to check the patch in progress; that way problems can be dealt with as they occur. When you are done patching and troubleshooting your system, programming can begin. For information on troubleshooting a system, see "Testing and Troubleshooting" on page 93.

Patching Channel-Based Consoles

Channel-based consoles force an operator to patch fixture parameters one channel at a time. As above, once the numbering system has been determined for the fixtures, patching the console can begin. However, the fixture number will now be a "group" number. You will need to make a group of channels for each fixture and store it as the fixture number. Remember, when patching a VL5 or VL5B wash luminaire, to patch dimmer channel to the intensity control channel for the fixture. Most channel based consoles will operate only in an 8-bit environment; you should be prepared to patch at least seven channels per luminaire plus the intensity channel if using Mode 1, or up to 11 channels per luminaire if using Mode 2.

Note: The VL6B, VL6C/VL6C+, VL7 and VL7B luminaires do not have a mode for 8-bit control. While they can still be controlled by an 8-bit console, the smoothing function of the second pan and tilt channel is lost.

With a channel-based console, using Groups to control the positioning, color, gobo and beam shaping functions will make the job of programming your show easier.

Using the Console to Make Programming Easier

Though different console manufacturers use different syntax, they can all achieve the same goal: store often-used data that can be recalled at a keystroke in a manner that makes it easy to access. Libraries, focus points, groups and palettes are different manufacturers' terms, but all refer to memory locations that can be assigned to specific parameters. Color, gobo and beam parameters (edge, diffusion, beam size) can all be stored in these groups and recalled with a few keystrokes. On consoles where this is applicable, groups can be stored in ranges, making it easier to recall information. For example, Color Groups can be stored in Groups 50 to 70, Gobo Groups in 80 to 95, and so on. The same can be said for certain other groups like libraries.

Note: Some consoles define groups globally, others require the programmer to create a hard value for each fixture for the particular parameter being stored in the group. A global group is stored for a whole fixture type from only one fixture, making storing a simpler task.

Many fixture-library based consoles also provide an added feature: updatable preset focus or focus points. These are special groups reserved for focus (pan/tilt) positions; however, they can be used for anything that might be changed throughout the entire cue list of a show. Any and all cues built and stored from an updatable preset focus group can be adjusted by refocusing and restoring the group. The cues then reference this group for positioning or other information as recorded.

Luminaire Timing Channels

Timing channel control has been developed for VARI✳LITE® Series 200/300 luminaires to improve the timed moves of certain groups of parameters. They provide 3 timing channels, one for Focus (Pan and Tilt), one for color parameters and one for beam parameters. Timing channels support time values of up to six minutes.

A timing value of zero is full speed. A time value of 100% (or 255 in DMX512) causes the associated parameter(s) to follow cue fade time rather than then timing channel.

To use these channels, you must:

Step 1. Create the cue, including color, gobo, edge, diffusion, etc.

Step 2. Decide which fixtures and which parameter groups will use timing channels.(Timing channels work only if all channels affected by the timing channel are in the same part of the cue.)

Step 3. Assign a value to the particular timing channel(s) you wish to use (see "Timing Channels" on page 137).

Step 4. Create a part cue containing only the attributes chosen and their associated timing channels. Store this part cue with a fade time of zero seconds.

Step 5. Store the rest of the cue using console timing.

Note: Avoid changing timing channel values in a fading cue. This can cause unexpected behavior in the luminaire as the timing channel value is updated over time. Timing channel values and the final destination of the parameters affected by the timing channel should always be sent in a zero count.

Timing channels can be set in either % or 0-255 (DMX512) modes, with the following values assigned. See "Timing Channels" on page 137 for more information.

Note: We recommend profiles set timing channels in extended modes to a default value of 255 (full speed). .

Channel Function	Timing Channel		
	Focus Time	Color Time	Beam Time
Pan (Hi Byte / Lo Byte)	◆		
Tilt (Hi Byte / Lo Byte)	◆		
Blue		◆	
Amber		◆	
Magenta		◆	
Color Wheel		◆	
Diffusion			◆
Lens (Edge)			◆
Rotating Gobo			◆
Fixed Gobo			◆
Beam Iris			◆

Note: The Focus timing channel will affect only the VLM moving mirror's pan transitions when the rotation channel is used.

Mini-Stepping

Mini-stepping has been added for the VL6 gobo and color wheels when an extended mode (Mode 2, 4, 6, 8 or 10) is used. Mini-stepping, which smooths wheel transitions, will be active for Wheel 1 (gobo) when the beam time channel has a value between 1 and 254. It will be active for Wheel 2 (color) when the color time channel has a value between 1 and 254. When the value is set at either 0 or 255, mini-stepping will be inactive.

Luminaire Reset

The ability to reset (recalibrate) a luminaire is available for DMX512 consoles. The reset channel will cause the associated luminaire to recalibrate when set to 33% (84 in DMX512) for three seconds and then returned to zero. (This must be done with a numeric keypad, not with an encoder or potentiometer.)

When used with a DMX Power Pack (DPP) or Series 200 luminaires, this channel also allows for remote start and douse of an arc source. When the channel is set to 66% (168 in DMX512) for three seconds and then returned to zero, the lamp will douse. When set to 99% (252 in DMX512) for three seconds and then returned to zero, the lamp will strike. (This should be done with a numeric keypad not with an encoder or potentiometer.)

Note: Intermediate values occurring between the command value and zero will cancel the command.

Equipment Power Requirements

Overview

The first consideration when hooking up a lighting system is power. Power is provided by large transformers in most permanent venues. Portable generators may be provided for other applications.

Consoles, luminaires, and repeaters operate off of a single phase of power, however, the system is commonly connected to AC services that provide three phases of power. When connecting to a house service with three-phase power, the power should be distributed evenly across the breakers on the ACS rack, mini-ACS rack, and Six-pack chassis (refer to "Phase Balancing" on page 21).

The following section provides guidelines for connecting VARI✻LITE® Series 200/300 equipment to an AC service.

Three-Phase Power Source

Delta/Wye Configuration

The system is commonly connected to a three-phase AC power source. Three-phase AC power is produced by alternators which contain three separate windings designed so that the voltages induced in them are equal in amplitude and out of phase with each other by exactly 120 degrees. The outputs can be connected in one of two methods to produce a three-wire, three-phase circuit: wye-connected source and the delta-connected source.

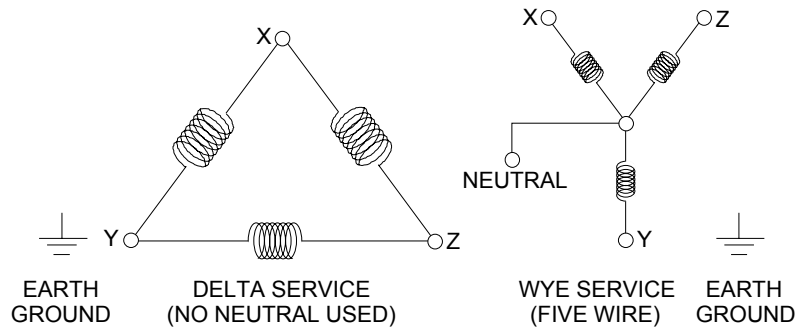


Figure 1-5: Delta/Wye Configuration

In almost all cases the power source (house service) will be wye connected, but Series 200/300 equipment may be connected either as delta or wye loads as required. The most obvious difference between delta and wye loads is that a wye load uses a neutral and a delta load does not.

Note: The Series 200 powered outputs on the modular rack utilize the service neutral, and therefore must not be used with a delta service, and requires the presence of a neutral, even when connected as a delta load.

There are five connections for a wye source and four connections for a delta source. Cables are often color coded to represent corresponding connections.

	Delta Power*		Wye Power	
Connection	**US Color Code**	**UK Colour Code**	**US Color Code**	**UK Colour Code**
Phase X	Black	Red	Black	Red
Phase Y	Red	Yellow	Red	Yellow
Phase Z	Blue	Blue	Blue	Blue
Neutral	N/A	N/A	White	Black
Ground	Green	Green	Green	Green

* Not applicable in Europe.

Input Voltage

When the system is configured for delta operation, the input voltage to the luminaires equals the phase-to-phase voltage of the power source. When the system is configured for wye operation, the input voltage to the luminaires equals the phase-to-neutral voltage of the power source. Single-phase power can be used to operate the system by configuring the equipment for wye operation and connecting all three phase inputs to the same single-phase source. APS6 and C3 modules usually operate under three-phase power, but can also be operated under 180-240 VAC, single phase mains with L1, L2, and L3 tied together at the SixPack chassis.

Typical wye services in the United States produce voltages ranging from 175 to 225 VAC phase-to-phase and 90 to 130 VAC phase-to-neutral. The SixPack Chassis and the ACS rack should be placed in delta mode so that the racks produce 175 to 225 VAC to the system. AC for the system is produced across the phases.

In Europe, wye services produce voltages ranging from 310 to 415 VAC phase-to-phase and 180 to 240 VAC phase-to-neutral. Since the system can not operate in voltages above 260 VAC, the SixPack Chassis and ACS rack must be placed in wye mode, thus activating the neutral and placing the system into the standard 180 to 240 VAC operating range.

Configuring Equipment For Delta or Wye Operation

WARNING: Voltage high enough to injure or kill persons exists in the Series 200 ACS rack when power is applied. Verify that power has been removed from ACS rack before reconfiguring bus bars or performing other internal work.

Determine requirements for either delta or wye load.

- While operation as a delta load is typical in the U.S., most European countries require the system to be configured as a wye load. For example, if the house service is a wye-connected source and the phase-to-neutral voltage is 220, the system must be configured as a wye load.
- Also note that if line voltage is 120 phase-to-neutral, the system must be configured as a delta load. If line voltage is 220 phase-to-neutral, the system must be configured as a wye load.

Type	VAC Phase to Neutral	VAC Phase to Phase	Delta/Wye Jumper Position	Voltage to Modules
Wye	100-130	175 - 225	Delta	175 - 225
Wye	180 - 240	310 - 415	Wye	180 - 240
Delta	-	180 - 240	Delta	180 - 240
Single Phase	180 - 240	-	Wye	180 - 240

In the Series 200 ACS rack, the system is configured by moving three bus bars. The mini-ACS rack and Series 300 Modular Rack SixPack chassis use a switch. The SixPack chassis has a switch lock that must be removed before the switch can be moved from one position to the other. This prevents accidental switching.

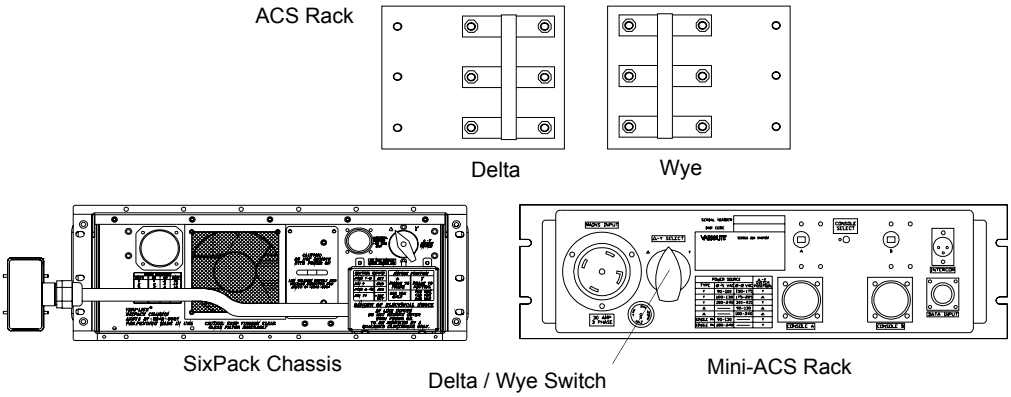


Figure 1-6: Setting Delta/Wye Configuration in Series 200 and Series 300 Equipment

Phase Balancing

Repeater Boxes and SixPack chassis should be phase balanced. Phase balancing for a Repeater Box occurs when all the luminaires in a system are equally distributed across the X, Y, and Z input phases. For a SixPack chassis, phase balancing occurs when the APS6 and/or C3 modules are equally distributed across the three input phases of the unit. A balanced system draws approximately equal currents from each phase. An unbalanced system may draw much more current from one phase than from the other two phases.

Note: Phase balancing is especially important when a generator is the power source for the system. However, it is always good to balance the system even when the power source is a normal house service.

Phase balancing is accomplished at the Repeater Box outputs. There are nine luminaire connections on the Repeater Box, with three of them connected to each phase. To balance the system, ensure that repeater/lamp cable connections are made so that each phase has the same number of luminaires or Smart Repeater units connected.

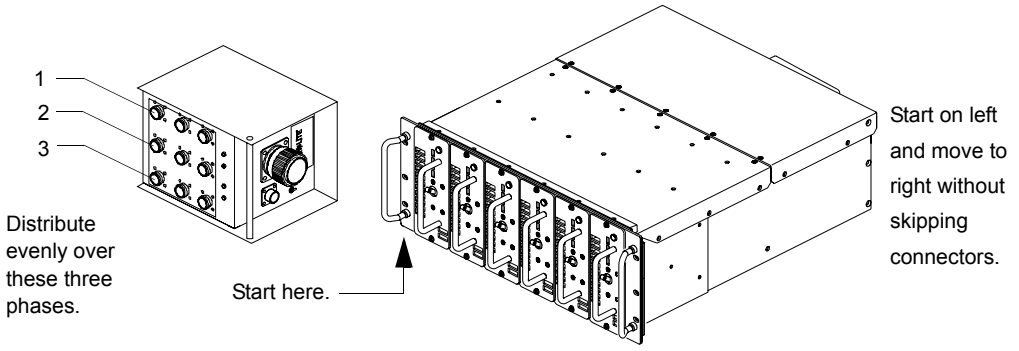


Figure 1-7: Phase Balancing

Current Requirements

Current calculations are required to ensure that the system has adequate circuit breaker safety control. The AC line disconnect has a 200A circuit breaker to handle the Series 300 Modular Racks and Series 200 ACS racks. Depending on the quantity and type of luminaires and the voltage used, the current varies. Although the maximum operating limit for the AC line disconnect is 200A, we recommend that continuous operating current does not exceed 150A. This will avoid tripping the circuit breaker. Systems drawing power in excess of 150A will require multiple modular racks, ACS racks and AC line disconnects. The same is true for the 30A mini-ACS line disconnect. We recommend that continuous operating current does not exceed 20A.

Equipment current requirements vary with the AC line voltage available. Linear voltage regulators dissipate more power at higher line voltages and consume more current. Switch-mode regulators maintain constant power into a load and consume more power at lower line voltages. Some power is lost in long cable runs, resulting in lower line voltages at the equipment, with the corresponding impact on current requirements. Two factors determine the current requirements of a system: output voltage of the modular rack and ACS rack and number and type of luminaires in the system.

Current Calculation

The current requirements for VARI*LITE® equipment are provided here. For Series 300 luminaires, the current requirement is expressed as the current draw on a Smart Repeater unit that is fully loaded with six luminaires with each luminaire operating all motors (a maximum power draw scenario). All VARI*LITE® Series 200/300 AC voltage selector boards are designed to operate the equipment within one of three voltage ranges: 80 to 130 VAC, 170 to 260 VAC, or 80-260 VAC.

Because of the complexities of calculating three-phase power requirements, this data will never be 100% accurate, and is intended for guidance only. It is recommended that a 20% headroom allowance be added to the final phase figures to allow for imbalances.

CAUTION: Only 50 VL2B and VL2C luminaires may be connected to a Series 200 ACS rack and only nine may be connected to a mini-ACS rack due to the current requirements.

CAUTION: To avoid damage to equipment and to ensure proper equipment operation, consult with local staff regarding power concerns.

Equipment	120 Volts Phase to Neutral60 Hz Wye Mode	208 Volts Phase to Phase60 Hz Delta Mode	240 Volts Phase to Neutral I50 Hz Wye Mode
VL2C Luminaire	11.0 amps	6.5 amps	6.3 amps
VL4 Luminaire	8.0 amps	4.8 amps	4.5 amps
Smart Repeater	9.6 amps	5.2 amps	6.0 amps
Smart Repeater Plus	12.8 amps	7.2 amps	6.5 amps
DMX200	1.0 amps	0.2 amps	0.3 amps
SPC-36 Controller	1.0 amps	0.2 amps	0.3 amps
APS6 Module (400W)	6.7 amps	3.7 amps	3.6 amps
APS6 Module (625W)	9.5 amps	5.5 amps	5.1 amps
APS6 Module (700W)	11.5 amps	5.8 amps	7.4 amps
C3 Module (1000W)	N/A	4.7 amps	4.3 amps
C3 Module (1200W)	N/A	5.2 amps	5.1 amps
DMX Power Pack	10.0 amps	6.0 amps	5.0 amps

Power Metering

WARNING: Power metering and connection to a house AC service should only be performed by qualified personnel. This personnel is typically a "house electrician" supplied by the venue or other contract electrician supplied by the venue for this purpose. This manual does not supply procedures for metering a house AC service nor does it imply that persons using this equipment are required to meter any type of house AC service.

Notes

2. Equipment Description

This chapter contains detailed information on all the equipment used in a system.

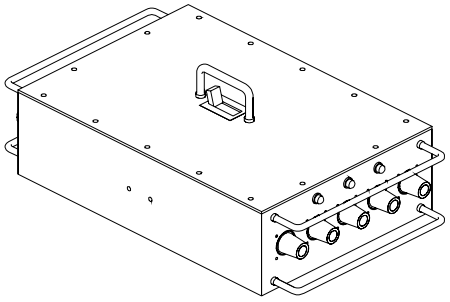
- **Power and Data Distribution Equipment**
- **Modular Rack Components**
- **Luminaires**
- **Cables**

Power and Data Distribution Equipment

AC Line Disconnect (200A)

CAUTION: Although the maximum operating limit is 200A, we recommend that continuous operating current does not exceed 150A.

The 200A AC line disconnect is a safety device containing a three-phase, 200A circuit breaker serving as a master on/off switch for the system. The unit connects to house service through a set of five, 10-foot, 2/0 pig tails. The line disconnect connects to the ACS rack through a set of five, 20-foot and/or 80-foot, 2/0 pig tail cable assemblies. One line disconnect is required for each 200A service.



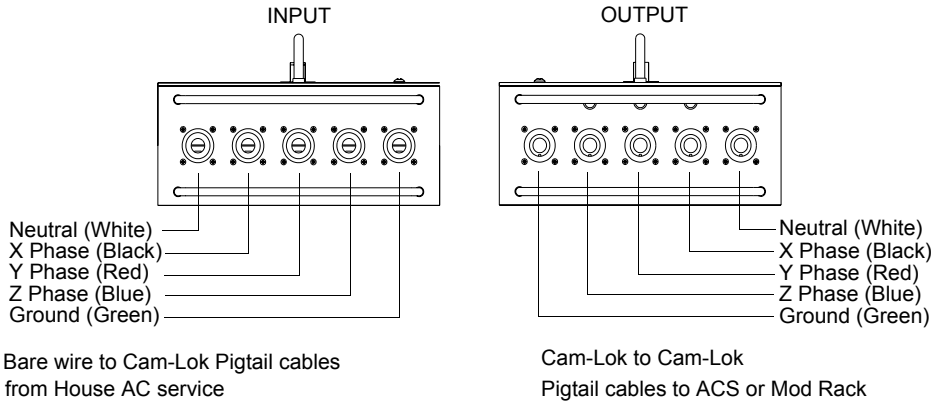
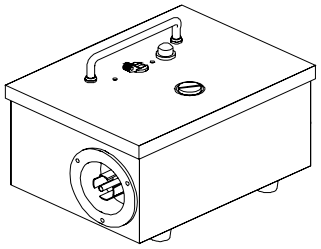


Figure 2-1: AC Line Disconnect

Mini AC Line Disconnect (30A)

CAUTION: Although the maximum operating limit is 30A, we recommend that continuous operating current does not exceed 20A.

The mini (30A) AC line disconnect is a safety device containing a three-phase, 30A circuit breaker serving as a master on/off switch for the system. It is similar to the 200A AC line disconnect, but is used primarily for smaller systems. The unit connects to 30A service through a 10-foot, 8/5 pig tail. There are two types of cable assemblies: receptacle connector to bare pigtails, and receptacle connector to plug connector. The mini line disconnect connects to the mini-ACS rack with a 20- or 80-foot, 8/5 cable assembly. One line disconnect is required for each 30A service.



CAUTION: The mini (30A) AC disconnect is not approved for use in Europe.

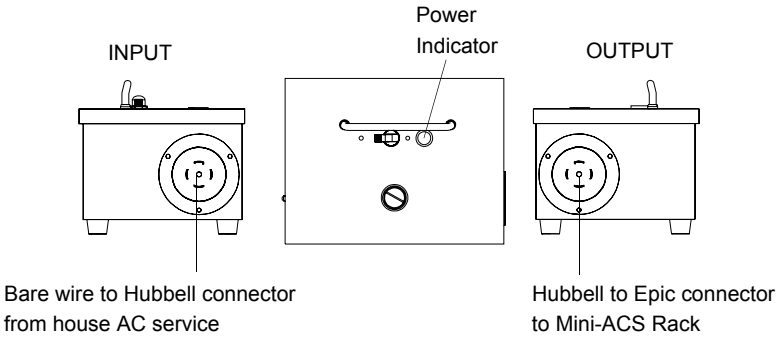
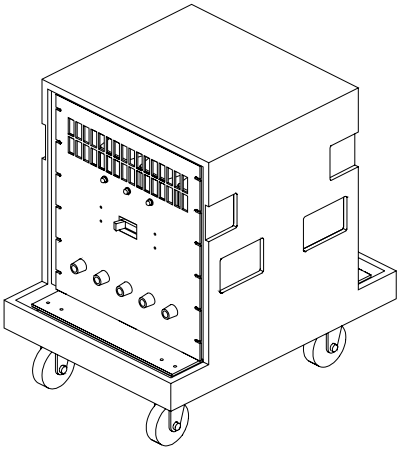


Figure 2-2: Mini AC Line Disconnect

Bucking Transformer

Note: In Europe, the Bucking Transformer is needed only with VL2C luminaires and where the primary voltage rises above 240 VAC (245 VAC in Europe).



The Bucking Transformer is used when the primary voltage is above 240 volts (or 245 volts in Europe). In Europe and Australia, among other places, primary voltages can fluctuate between 240 and 265 VAC throughout the day, causing the system to shut down. The Bucking Transformer is designed to reduce the primary voltage by 10 or 20 percent, bringing voltages within acceptable limits. Even if there is a temporary reduction in primary input voltage below 180 VAC (the lower limit), once the system is running, it will not actually shut off until the voltage falls to 160 VAC. The Bucking Transformer is only necessary where the primary voltage rises above 240 VAC (or 245 VAC in Europe).

The unit connects to the system by a set of five 2/0 pig tails. It also provides a 125A circuit breaker switch.

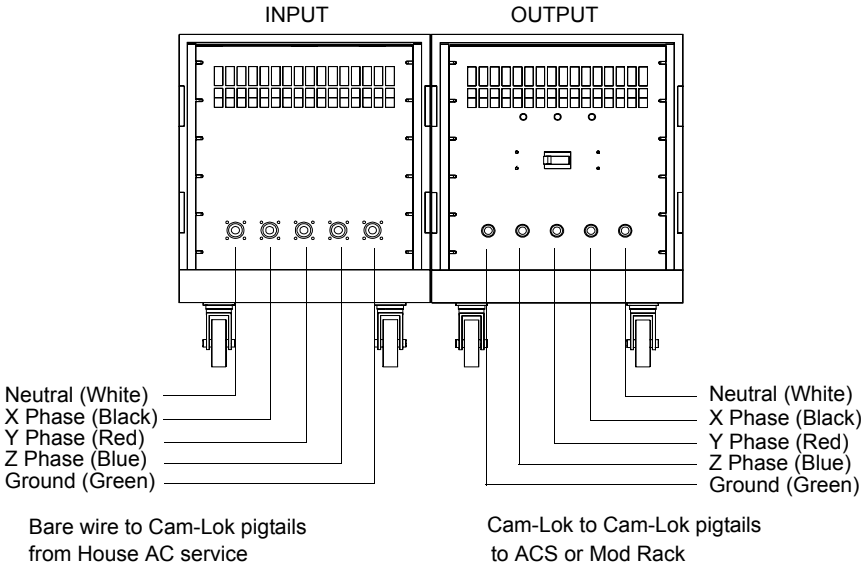
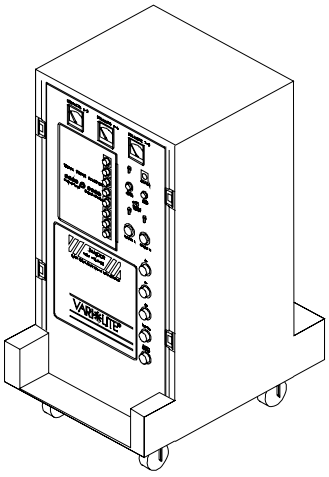


Figure 2-3: Bucking Transformer

ACS Rack



In a DMX512 controlled system the ACS rack is a power/data distribution unit for Series 200 luminaires only. The ACS rack connects to a DMX512 control console via a DMX200 interface

ACS rack functions:

- Receives 3-phase AC input power from a house service or modular rack via Cam-Lok to Cam-Lok pigtails. (A 200A AC disconnect should always be used in-line prior to the equipment.)
- Provides AC power to the console.
- Distributes data and power to the luminaires via Repeater Boxes. (Up to seven repeaters may be connected via Series 200 trunk cables.)

There are two models of ACS racks: the standard ACS rack and ACS rack with backup. The ACS rack with backup has the same features as the standard rack, but has three powered output channels on the rack input panel to provide power for low current devices such as the VLD, UDM or SPC-36 controller.

Note: In DMX512 controlled systems, only VL2C and VL4 luminaires may be controlled through the ACS rack.

In addition, the ACS rack with backup contains a complete backup set of signal processing cards. These backup units are easily connected via a free-hang connector panel located behind the input panel access door.

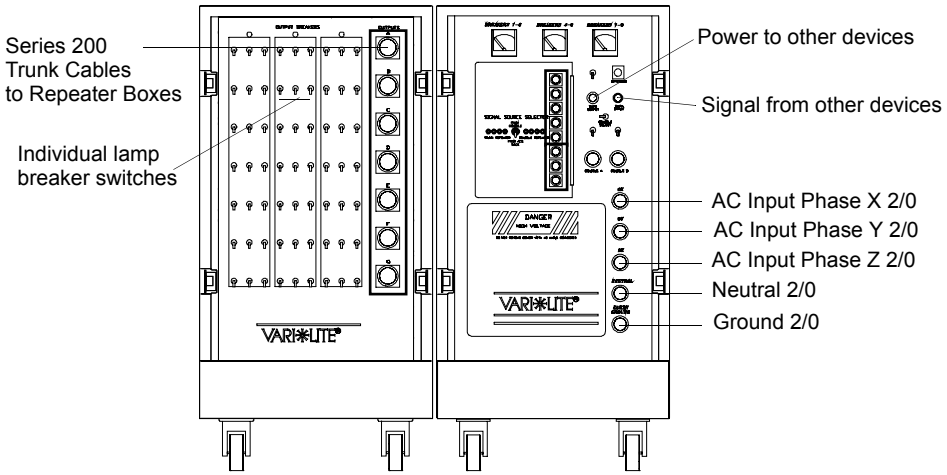
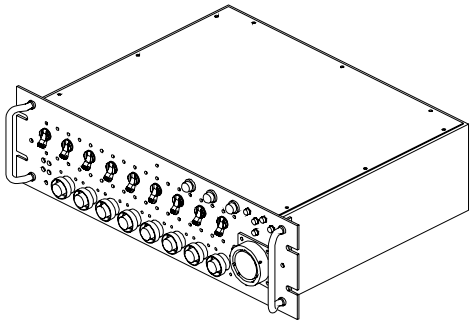


Figure 2-4: Series 200 ACS Rack

Mini-ACS Rack



The mini-ACS rack is a small rack mount version of the ACS rack.

Unit features:

- Provides 17 channels of power and signal.
- Provides one trunk run output and eight powered lamp cable outputs.
- Can be used as master or slave rack in large systems.

House power connects to the mini-ACS rack through an 8/5 cable with Hubbell connectors, connected from a mini-AC line disconnect. Two other power cables are available for connection: Hubbell plug connector to bare pigtails and Epic plug connector to Hubbell receptacle connector.

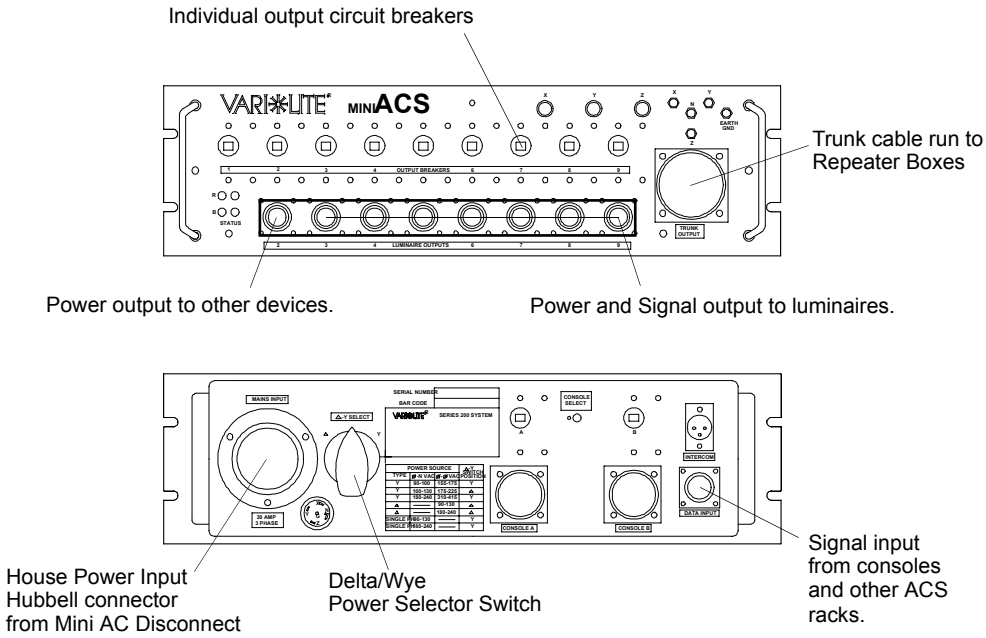


Figure 2-5: Mini-ACS Rack

Repeater Box/Cheater Repeater Box

Repeater Boxes receive data and power from the ACS rack and pass it along to luminaires. The Repeater Box serves as a signal and AC power distribution unit.

Repeater Boxes provide the following:

- Signal and power distribution for up to nine luminaires via Series 200 lamp runs.
- Connects to VL2B, VL2C and VL4 luminaires, and Smart Repeaters.

Attaches to trusses and pipes with a single Series 200 truss hook and a safety cable.

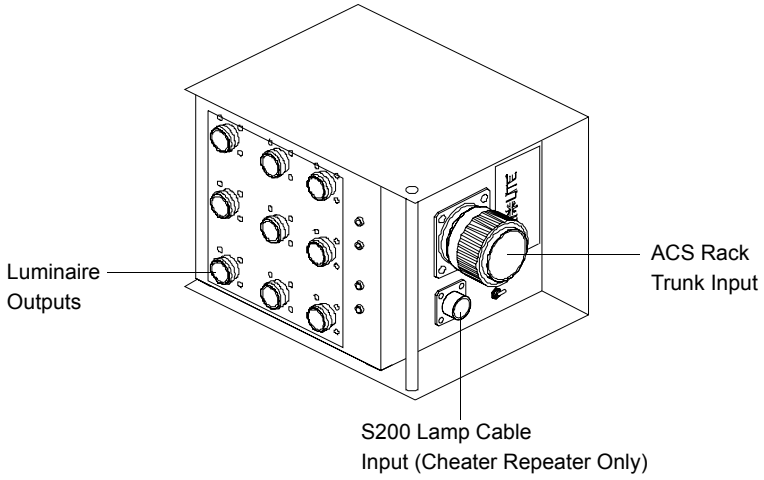
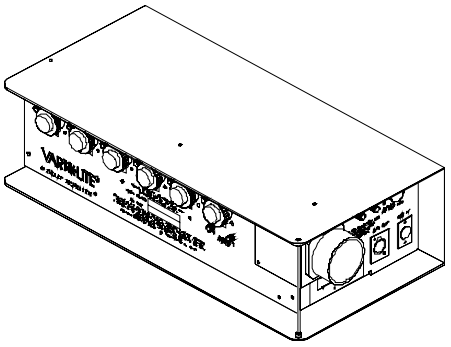


Figure 2-6: Repeater Box / Cheater Repeater Box

Cheater Repeater Box. Can be identified by the blue outer case as well as the lamp connector and switch mounted on the same panel as the trunk connector. When the switch is pointing away from the lamp cable connector, the unit behaves as a Repeater Box. Both the power and data are supplied via the trunk cable. Any signal present at the lamp cable connector is ignored. When the switch is pointing towards the lamp cable connector, power is still supplied via the trunk cable. However, the data is received from a secondary source via the lamp cable. In most cases, the data would come from a second control console with a cheater cord.

Smart Repeater Units



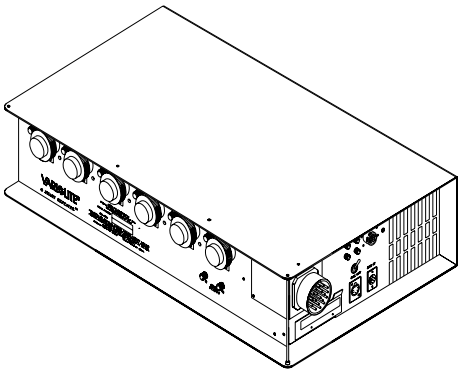
The Smart Repeater processing units combine electrical power and data signals from different sources and provide it for up to six Series 300 luminaires via a single connector to each luminaire.

Smart Repeater features:

- Receives Series 200 data signal and AC power for electronics through standard, 9-pin Series 200 lamp cable from ACS rack and sends it to connected luminaires.
- Receives lamp power from conventional dimmers or APS6/C3 power supply modules through standard Socapex-type 19-pin lighting connector and sends it to connected luminaires.
- Provides a thumbwheel switch for setting the starting address for the six luminaire outputs.
- Provides Broadcast and Reply LEDs to monitor data traffic.
- Contains test software for Series 300 luminaires.
- Attaches to truss or pipes with two truss hooks and a safety cable.
- Operates up to six VL5, VL5Arc, VL5B, VL6, or VLM luminaires, one on each output connector.
- Operates VL6B and VL6C/VL6C+ luminaires on a limited basis. When using luminaire combinations involving the VL6B, use the point system indicated below:
  VL5 = 1 point
  VL5Arc = 1 point
  VL6 = 1 point
  VL6B = 2 points
  VL6C = 2 points
  VL6C+ = 2 points
  Combinations of luminaires connected to the Smart Repeater unit should not exceed 6 points.
- Accepts DMX512 protocol from DMX512 control desks and translates it to Series 300 comm for DMX512 control of VARI✻LITE luminaires.

Two versions of the unit are available: a standard Smart Repeater unit and a Smart Repeater Plus unit. The standard unit can operate any of the Series 300 luminaires with the exception of the VL7 Series luminaire, which can only be operated with a Smart Repeater Plus unit.

Smart Repeater Plus Unit



The Smart Repeater Plus unit provides power and data for VL7 Series luminaires, which require additional power not available with the standard Smart Repeater unit. The Smart Repeater Plus unit has the ability to operate all Series 300 luminaires.

Operation and functionality of the Smart Repeater Plus unit is identical to the standard unit, with the addition of an active DMX512 termination switch and fan cooling. The Plus unit can control up to six VL7 luminaires.

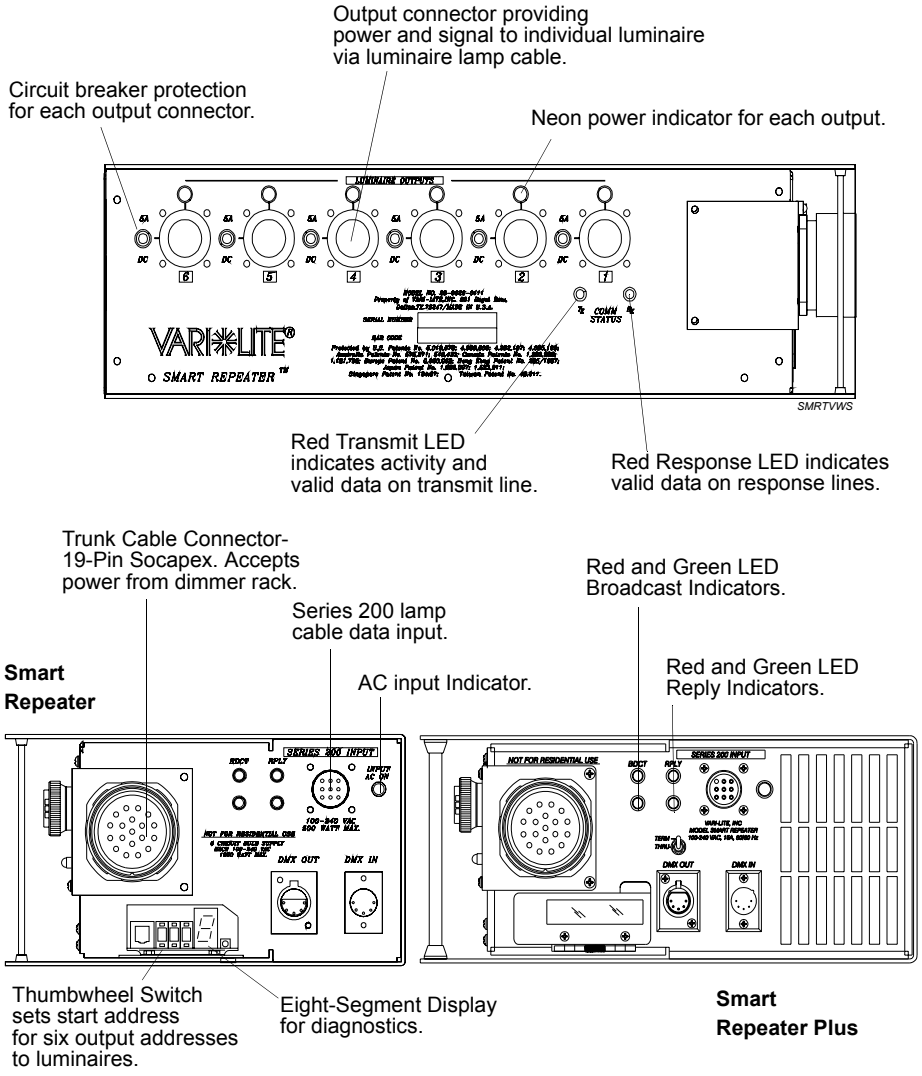
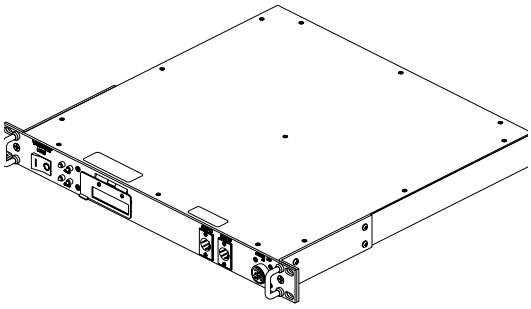


Figure 2-7: Smart Repeater / Smart Repeater Plus

DMX200 Interface

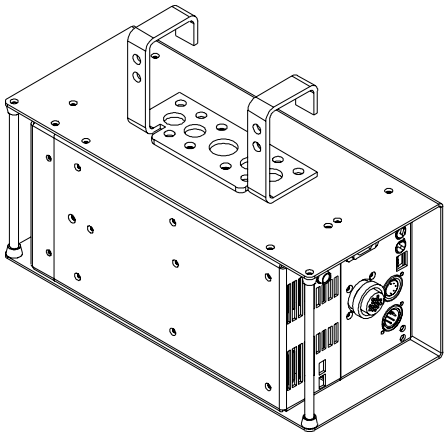
The DMX200 interface unit provides control of Series 200 luminaires from a DMX512 console.



- Converts DMX512 protocol to DMX200 data.
- Receives power from and supplies data to the ACS rack through a special power/data "Y" cable.
- Supports up to one bi-channel ACS rack using two universes of DMX512.
- Designed to fit standard rack mount boxes or the modular rack.

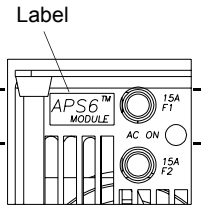
DMX Power Pack and DPP Plus

The DMX Power Pack (DPP) is a portable electronics chassis that provides lamp power, and translates DMX512 protocol to Series 300 luminaire protocol. There are two versions of the DPP; one for arc lamps and one for incandescent lamps. The two versions of the DPP are indicated with either an APS6 or C3 module markings on the unit's front panel.



Two versions of the unit are available: a standard DPP unit and a DPP plus unit. The standard unit can operate any of the Series 300 luminaires with the exception of the VL7 Series luminaires, which can only be operated with a DPP plus unit.

The DPP Plus includes a power supply and APS6 suitable for powering the VL7 Series luminaires.



Note: A label at the input panel specifies APS6 or C3.

Dimmers

If there are VL5 luminaires in your system, you will also need to supply power to the dimmers that are associated with these luminaires. This is not a concern if you are using the house dimming system. However, if you are adding dimmers to your system, or are setting up all the elements of your event, you will need to power your dimmers. In general, most dimmers require three-phase power for operation. You should consult the operating manual provided by your dimmer manufacturer for the proper power requirements for your dimmers.

In addition, some dimmer manufacturers reverse the ground and neutral Cam-Lok connectors on their product. You may need to provide for specific adapters between equipment. Again, consult the manufacturer or their authorized representative for plugging options and adapters.

In most cases, unless specifically requested, you will not receive APS6 cable (AKA Shielded Socapex cable) with the rental of VL5 wash luminaires, unless your rental includes C3 modules and/or dimmers. Speak with your Account Manger for equipment specifics. If the VARI✻LITE® Series 200/300 system is being installed into an existing light plot, the Smart Repeater units may plug directly into circuits on electrics or battens using a "fan-in"; a male stage pin (or other male plug) to female Socapex adapter. You may need to supply Socapex multicore and breakouts as necessary.

Modular Rack Components

24-Channel Modular Rack

The 24-Channel Modular Rack is a configurable power distribution system containing the dimmers and ballasts for Series 300 luminaires.

The Modular Rack contains:

- One set of Cam-Lok pigtail contacts for AC input power.
- One set of Cam-Lok pigtail contacts for AC output power.
- Six Epic AC connectors for SixPack Chassis power distribution.
- Individual 30 Amp circuit breakers for each Epic connector.
- One SPC-36 SixPack controller (optional).
- Up to six SixPack chassis assemblies (four housed in the rack with up to two on top). Each SixPack chassis may contain up to six C3 (dimmer) or APS6 (ballast) modules in any combination.

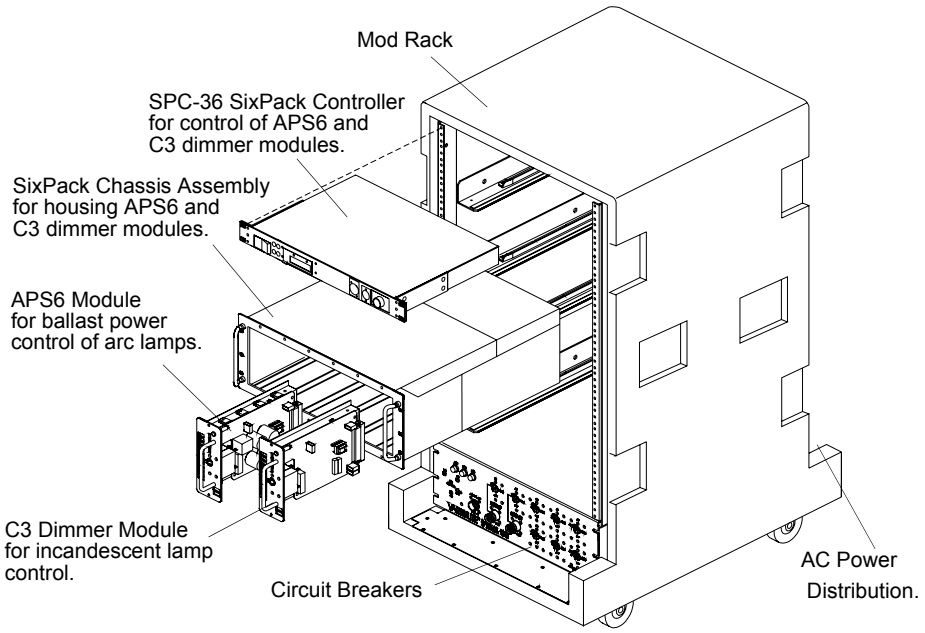
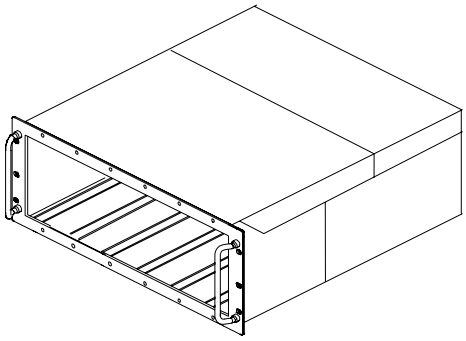


Figure 2-8: Series 300 Modular Rack

SixPack Chassis



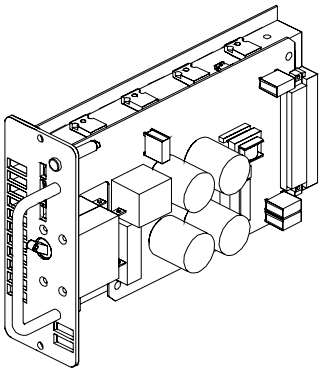
The SixPack chassis is a removable unit which holds up to six C3 (dimmer) or APS6 (ballast) modules. The modules slide-mount into the chassis and are electrically connected via euro-connectors. (Blank panel cover plates are installed in positions where modules are not installed to aid the forced air cooling.)

Its capability to support both APS6 and C3 modules in any combination will allow mixing different types of Series 300 luminaires on a single Smart Repeater unit.

To distribute lamp power to Series 300 luminaires, each chassis is connected to a Smart Repeater unit with a Series 300 trunk cable.

Note: The LVS power supply module 110V mode of operation has been disabled. The chassis will not operate below 200 volts nominal.

C3 Module

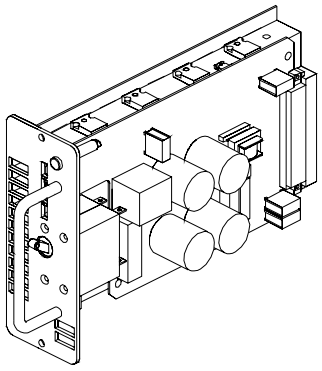


The C3 dimmer module is an electronic dimmer for high wattage tungsten halogen incandescent lamps. It is used to dim VL5 and VL5B luminaire incandescent lamps. The module is designed to slide-mount into any of the front slots on the SixPack chassis, connecting electrically via euro-connectors.

Since the C3 module does not have its own built-in brightness curve, the module must be used in conjunction with an SPC-36 controller, which has the brightness curve in its operating system. The SPC-36 controller outputs 0 to +10 volts DC, which corresponds to 0% and 100% output respectively.

A PCB jumper allows the module's lamp current output to be configured for 1000 or 1200 watts.

APS6 Module

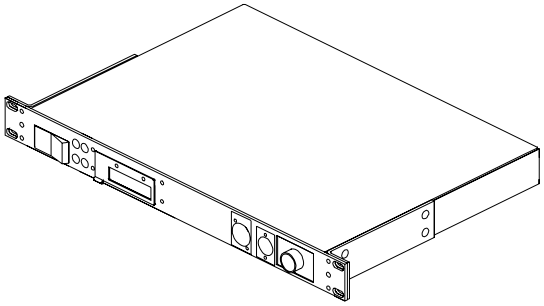


The APS6 power supply module is an electronic ballast for high intensity discharge arc lamps. It is used to power VL5Arc, VL6 series, and VL7 series luminaire arc lamps. The module is designed to slide-mount into any of the front slots on the SixPack chassis, connecting electrically via euro-connectors.

Switches on the faceplate (or PCB jumpers on older models) allow the module to be configured for a specific output wattage and enable or disable the remote start feature. If the remote start feature is desired, the modules must be used in conjunction with an SPC-36 controller.

The PSET (Preset) mode enables manual control of the module. This is the normal mode of operation. Use this mode when not using an SPC-36 controller to remotely control modules from an Artisan console. The DCV (Dimmer Control Voltage) mode operates the module with 0-10Vdc control input. This mode is required when using an SPC-36 controller to remotely control modules from an Artisan console.

SPC-36 SixPack Controller



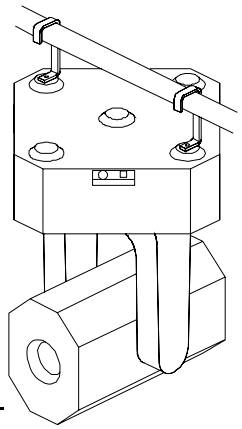
The SPC-36 controller is a 36-channel analog dimmer interface that will interface to APS6 and C3 modules (only).

- The unit receives power through a Series 200 lamp run.
- In DMX512 mode, all channels are mapped to the default type: incandescent with 0 percent preheat (0 volts output).

Note: Avoid fading an SPC-36 controller channel mapped to an APS6 (remote start) up and down. This will cause shortened lamp life. APS6 channels should be set to a curve of "full at 1%" if possible.

Luminaires

VL2C Spot Luminaire

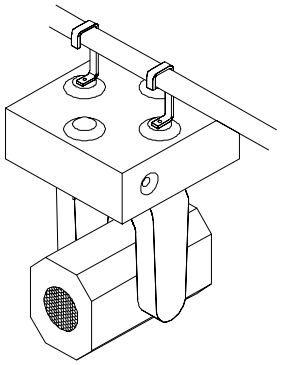


The VL2C spot luminaire features the following:

- Metal halide arc lamp (400 watt for VL2B; 600 watt for VL2C).
- Compound lens for distortion-free images with soft or hard beam edge.
- 120 colors provided by DICRO✻WHEEL™ color mixing system.
- Lens free aperture to eliminate glare.
- Adjustable beam shape.
- On-board control electronics and power supply.
- Attaches to truss or pipes using two or three S200 truss hooks and a safety cable.

Note: For DMX512 Modes, Channel Mapping, and Color Reference see "Reference Tables" on page 119.

VL4 Wash Luminaire

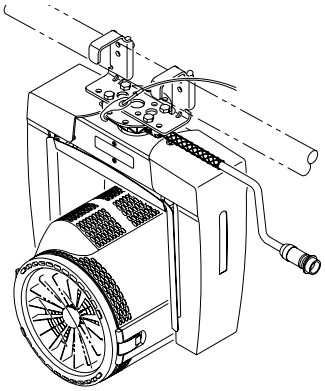


The VL4 wash luminaire features the following:

- 400 watt metal halide arc lamp.
- DICRO✻TUNE™ color filters with independent blue, amber, and magenta color control.
- Mechanical dimmer for smooth full-field control.
- Shutter/douser for fast blackouts, bumps, and strobe-like effects.
- Textured glass diffuser.
- Variable position of lamp to reflector adjusts beam angle from spot to flood.
- Attaches to truss or pipes using two or three S200 truss hooks and a safety cable.

Note: For luminaire DMX512 modes, channel mapping, timing and color reference, refer to "Reference Tables" on page 119.

VL5 Series Wash Luminaires



All VL5, VL5B, and VL5Arc wash luminaires have the following standard features:

- DICRO✻TUNE color filters with independent blue, amber, and magenta color control.
- Choice of five interchangeable lens styles to customize beam output.
- Attaches to truss or pipes with a single S300 truss hook and a safety cable. A floor stand is also available.
- Dimming control by conventional dimmer or VARI✻LITE C3 power supply in conjunction with the SixPack chassis and SPC-36 controller. (Note the 1200W lamp can only be used with a 110V power source or a C3 dimmer module.)
- VL5Arc contains internal mechanical douser for intensity control.

Each individual configuration has the following features:

VL5 Luminaire

- High wattage (1000 or 1200 watt) incandescent lamp.
- Radial diffuser.

VL5B Luminaire

- High wattage (1000 or 1200 watt) incandescent lamp.
- Uses one standard and two pastel dichroic color filter sets.

VL5Arc Luminaire

- A 575 watt arc lamp.
- Radial douser for mechanical dimming.

Note: For luminaire DMX512 modes, channel mapping, timing and color reference, refer to "Reference Tables" on page 119.

VL6 Series Spot Luminaires

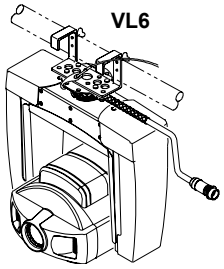
All VL6, VL6B, and VL6C/VL6C+ spot luminaires have the following standard features:

- Lamp power provided by APS6 power supply module in conjunction with a SixPack Chassis.
- Interchangeable, user selectable color wheel assembly.
- Interchangeable, user selectable gobo wheel assembly.
- Aluminum-bladed dimmer mechanism for full field dimming, timed fades, and strobe effects.
- Mechanical iris for continuous beam size control.
- Variable beam focus.
- Attaches to truss or pipes with a single S300 truss hook and a safety cable. A floor stand is also available.

Each individual configuration has the following features:

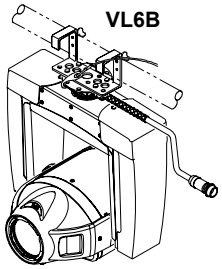
VL6 Luminaire

- A 400 watt short arc lamp.
- Choice of three lenses (narrow, medium, and wide field of view).



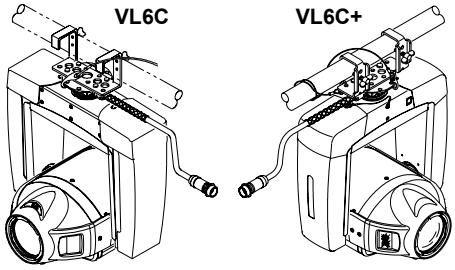
VL6B Luminaire

- A 400 watt short arc lamp.
- Rotatable, indexable gobos.
- A 3:1 zoom optics assembly.



VL6C and VL6C+ Luminaires

- A 700 watt short arc lamp
- Rotatable, indexable gobos.
- A 3:1 zoom optics assembly.



Note: For luminaire DMX512 modes, channel mapping, timing and color reference, refer to "Reference Tables" on page 119.

VL6 Color/Gobo Wheel Control

VL6 spot luminaire color/gobo wheels have 12 positions and are normally loaded with 11 color filters or gobos, leaving one position for open white. You can mix filters and gobos on the same wheel, or have all filters on one wheel with all gobos on the other wheel. Please advise an Account Manager if you wish to do this. The VL6 spot luminaires are supplied in standard configuration with all gobos on the front wheel (Wheel 1) and all filters on the rear wheel (Wheel 2).

Color and gobo wheels in VL6 luminaires can be placed on any step position of the motor. Wheel positions are mapped to DMX512 fader positions to control 96 static positions and five spin speeds. Percent values of 0 to 95 control static positions; values 96 through 100 control spin speeds.

Table 2-1: VL6 Standard Color/Gobo Wheel Positions

Standard Colors (Wheel 2)		
0	Open	
1	0240	Light Red
2	0850	Dark Blue
3	0540	Yellow
4	0820	Light Blue Green
5	0150	Cool Pink
6	0660	Green
7	0020	Magenta
8	0960	Deep Lavender
9	0320	Flesh Pink
10	0440	Orange
11	0990	Congo Blue

Standard Gobos (Wheel 1)		
0	Open	
1	7002	Pebbles
2	7001	Globular Breakup
3	6001	Medium Circle
4	5011	Night Sky
5	5501	Leaves
6	4202	Vertical Bars
7	4201	Horizontal Bars
8	7015	Block Breakup
9	7008	Waves
10	4009	Medium Triangle
11	6006	Circle of Holes #3

VL6B Color/Gobo Wheel Control

VL6B spot luminaire fixed color and gobo wheels have 12 positions, while the rotating gobo wheel has six positions. You can mix color filters and gobos on the same wheel, or have all filters on one wheel with all gobos on the other wheel. The VL6B spot luminaires are supplied in standard configuration with all gobos on the front wheel (Wheel 1) and all filters on the rear wheel (Wheel 2).

Color and gobo wheels in VL6 luminaires can be placed on any step position of the motor. Wheel positions are mapped to DMX512 fader positions to control 96 static positions and five spin speeds. Percent values of 0 to 95 control static positions; values 96 through 100 control spin speeds.

Table 2-2: VL6B Standard Color/Gobo Wheel Positions

Standard Colors (Wheel 2)		
0	Open	
1	0240	Light Red
2	0850	Dark Blue
3	0540	Yellow
4	0820	Lt. Blue Green
5	0150	Cool Pink
6	0660	Green
7	0020	Magenta
8	0960	Deep Lavender
9	0320	Flesh Pink
10	0440	Orange
11	0990	Congo Blue

Standard Gobos (Wheel 1)		
0	Open	
1	7002	Pebbles
2	7025	Dust Breakup
3	6001	Medium Circle
4	5011	Night Sky
5	5501	Leaves
6	4202	Vertical Bars
7	7008	Waves
8	7015	Block Breakup
9	5523	Tribal Breakup
10	5009	Liquid Texture
11	7029	Alpha Rays

Rotating Gobo Wheel		
0	Open	
1	8005	5 Facet Prism
2	6011	Circle of Ovals
3	4316	Hypno Spiral
4	6990	Spiral Stones
5	4305	Pinwheel

VL6C/VL6C+ Color/Gobo Wheel Control

The luminaire's fixed color and gobo wheels have twelve (12) positions, while the rotating gobo wheel has six (6) positions. You can mix color filters and gobos on the same wheel, or have all filters on one wheel with all gobos on the other wheel. VL6C/VL6C+ luminaires are shipped in a standard configuration with all gobos on the front wheel (Wheel 1) and all color filters on the rear wheel (Wheel 2).

Color and gobo wheels can be placed on any step position of the motor. Wheel positions are mapped to DMX512 fader positions to control 96 static positions and five (5) spin speeds. Percent values of 0 to 95 control static positions; values 96 through 100 control spin speeds.

Table 2-3: VL6C/VL6C+ Standard Color/Gobo Wheel Positions

Standard Colors (Wheel 2)		
0	Open	
1	0240	Light Red
2	0850	Dark Blue
3	0540	Yellow
4	0820	Lt. Blue Green
5	0150	Cool Pink
6	0660	Green
7	0020	Magenta
8	0960	Deep Lavender
9	0320	Flesh Pink
10	0440	Orange
11	0990	Congo Blue

Standard Gobos (Wheel 1)		
0	Open	
1	7002	Pebbles
2	7025	Dust Breakup
3	6001	Medium Circle
4	5011	Night Sky
5	5501	Leaves
6	4202	Vertical Bars
7	7008	Waves
8	7015	Block Breakup
9	5523	Tribal Breakup
10	5009	Liquid Texture
11	7029	Alpha Rays

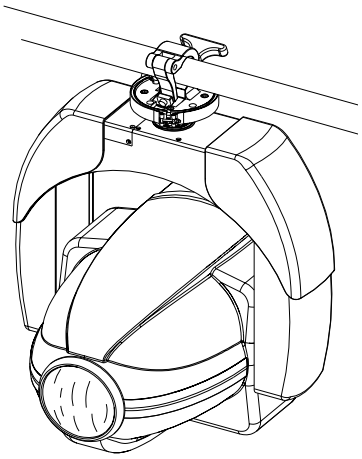
Rotating Gobo Wheel		
0	Open	
1	8005	4 Facet Prism
2	6011	Circle of Ovals
3	4316	Hypno Spiral
4	6990	Spiral Stones
5	4305	Pinwheel

VL7 Series Spot Luminaires

VL7/VL7U Luminaire

All VL7 luminaires have the following standard features:

- A 700 watt arc lamp.
- Full color spectrum, crossfadeable color mechanism.
- Wheel of rotatable and indexable gobos.
- Wheel for custom colors or fixed gobos.
- Zoom projection lens system.
- Dimmer mechanism.
- Douser/strobe mechanism.
- Beam size iris mechanism.
- Attaches to truss using one of two types of truss clamps or vertical hang assembly. A floor stand is also available.



VL7B/VL7UB Luminaire

The VL7B/VL7UB spot luminaire features a rotating beam framing shutter system that replaces the fixed wheel beam size iris assembly in the VL7/VL7U luminaire. (All other features are identical.)

Using shutter controls, zero is the open position and 255 is the closed position. Using rotation channels, 128 is the halfway or zero position and 0 and 255 are the end of travel stops.

Note: For luminaire DMX512 modes, channel mapping, timing and color reference, refer to "Reference Tables" on page 119.

VL7/VL7U/VL7B/VL7UB Color/Gobo Wheel Control

VL7 luminaire fixed color and gobo wheels have 12 positions, while the rotating gobo wheel has six positions. You can mix color filters and gobos on the same wheel, or have all filters on one wheel with all gobos on the other wheel. The VL7 luminaires are supplied in standard configuration with all gobos on the front wheel (Wheel 1) and all filters on the rear wheel (Wheel 2).

Color and gobo wheels in VL7 luminaires can be placed on any step position of the motor. Wheel positions are mapped to DMX512 fader positions to control 96 static positions and five spin speeds. Percent values of 0 to 95 control static positions; values 96 through 100 control spin speeds.

Table 2-4: VL7 Standard Gobo Wheel Positions

Static Gobo Wheel (VL7 Only)		
0	Open	
1	7002	Pebbles
2	7025	Dust Breakup
3	6001	Medium Circle
4	5011	Night Sky
5	5501	Leaves
6	4202	Vertical Bars
7	4212	New Horizon
8	7015	Block Breakup
9	5523	Tribal Breakup
10	6501	Geometric Shapes
11	7029	Alpha Rays

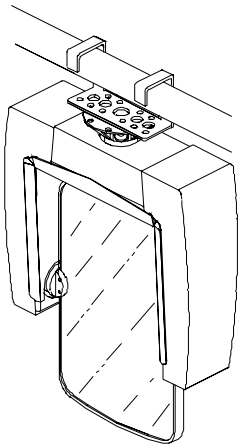
Rotating Gobo Wheel (VL7/VL7B)		
0	Open	
1	8005	5 Facet Prism
2	6011	Circle of Ovals
3	4316	Hypno Spiral
4	6990	Spiral Stones
5	4305	Pinwheel

VLM Moving Mirror

The VLM moving mirror is a fully-automated, lightweight, continuous tilt, automated mirror device.

The VLM mirror features:

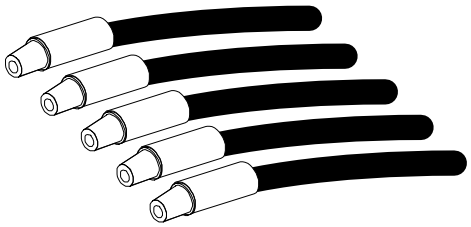
- Highly reflective dual-sided mirrored panels.
- Continuous spinning on the tilt axis.
- Attaches to truss or pipes with a single S300 truss hook and a safety cable. A floor stand is also available.



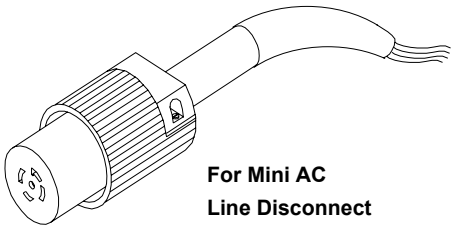
Cables

Note: Refer to "Cable/Connector Terminology" on page 3 for appropriate metric equivalents.

Pig Tails



For AC Line Disconnect



For Mini AC Line Disconnect

The pig tails used for the 200A AC Line Disconnect are a set of 10-foot, 2/0 power cables with Cam-Lok receptacle connectors on one end and bare wires on the other end. The bare wires are used to connect to the house service.

The pig tails used for the 30A mini-ACS line disconnect are a set of 10-foot, 8/5 power cables with bare wires on one end and a Hubbell receptacle connector on the other.

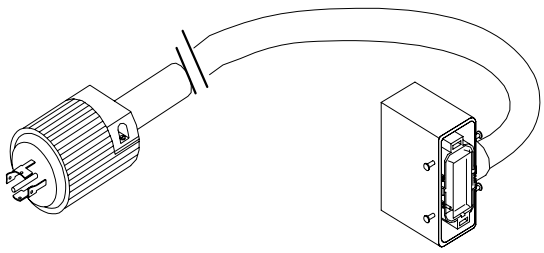
Power Input Cables

The power input cables are 2/0 cables rated at 200A, using color-coded Cam-Lok connectors to denote three phases, neutral, and ground. The cables are available in 20- and 80-foot lengths with Cam-Lok connectors on both ends.

The power input cable for the mini-ACS rack has a Hubbell plug on one end and a Hubbell receptacle on the other.

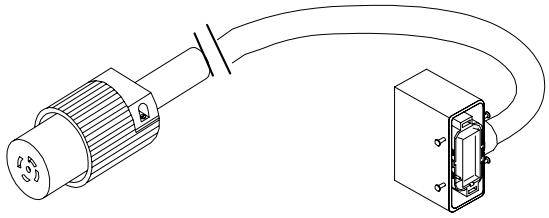
Mini-AC Disconnect to SixPack Chassis Input Cable

This input cable is used to supply power to a SixPack Chassis or a NIF unit when used with a mini-AC disconnect unit. This cable is connected to the mini-AC disconnect using the Hubbell connector. To use with a NIF, the Epic connector is mated to a "modular rack-to-NIF-unit" power cable. (Note the NIF unit end of the modular rack to NIF unit power cable utilizes a single clamping mechanism.)



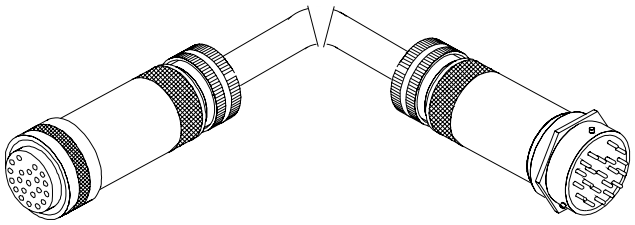
Modular Rack to Mini-ACS Rack Input Cable

This input cable is used to supply power to a mini-ACS rack when used with the modular rack. This cable uses a Hubbell receptacle on one end and an Epic plug on the other. It is connected from the AUX 1 or AUX 2 Epic receptacle at the modular rack to the Hubbell plug at the mini-ACS rack.



Series 200 Trunk Cable

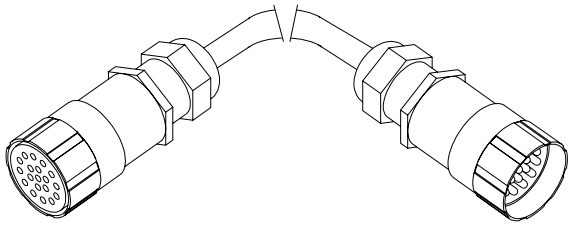
Series 200 trunk cables distribute power and data to Repeater Boxes for Series 200 luminaires. This cable uses a 41-position Pyle-National or Matrix Science connector. The cables are color-coded at each end to denote length: blue (100 feet), green (60 feet), white (30 feet).



Maximum recommended length is 500 feet.

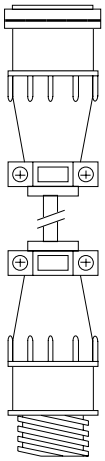
APS Trunk Cable

APS trunk cables (also called APS6 cables or APS6 trunk runs) distribute lamp power from SixPack chassis or conventional lighting dimmers to Smart Repeater units for Series 300 luminaires. This cable uses a 19-position Veam-Socapex compatible connector. The cables are color-coded at each end to denote length: blue (100 feet), green (60 feet), white (30 feet). This cable is similar to a standard Socapex cable except it contains special shielding for operation of VL5Arc/VL6/VL7 luminaires. When only operating VL5/VL5B luminaires on a Smart Repeater unit, industry standard 19-pin Socapex cables can be substituted for APS trunk cables.



Maximum recommended length is 1000 feet.

Series 200 Lamp Cable



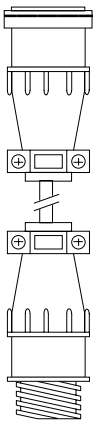
Series 200 lamp cables are shielded cables with a 9-pin Amp CPC connector at both ends. They are used as follows:

- To connect Series 200 luminaires to Repeater Boxes.
- To connect interface units and Smart Repeater units to Repeater Boxes and mini-ACS racks.
- To connect master ACS racks to slave ACS racks.

The cables are color coded at each end to denote standard lengths. For Series 200 lamp cables: white (6 feet), red (12 feet), yellow (20 feet), orange (50 feet), blue (100 feet).

Maximum recommended length is 100 feet.

Series 200 Data Link Cable



This cable contains only data conductors and is used only to interconnect slave ACS racks or mini-ACS racks to master ACS racks or mini-ACS racks. Data are carried on two individually shielded pairs with a common drain wire. The capacitance of the cable is very low, allowing the cable to be run for long distances with little signal degradation. Since the cable does not contain any power conductors, it must not be used for applications where connected equipment requires power. Slaving ACS racks is a signal-only operation, thereby permitting the use of this cable. This cable uses the same Amp CPC connectors as those on Series 200 lamp cables.

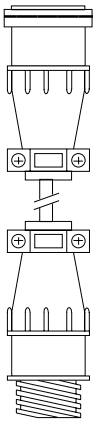
There is a practical limit to the number of cables that can be combined before minor signal degradation occurs. *No more than four cables* should be strung together to maintain signal integrity. This limits the number of connections (major sources of noise) to five (three between cables and two at each connection to ACS racks).

The cables are color-coded at each end to denote length: white (6 feet), red (12 feet), yellow (20 feet), orange (50 feet), blue (100 feet), violet (150 feet), brown (185 feet), green (200 feet), and gray (250 feet).

Maximum recommended length is 500 feet.

Note: In order to use this cable properly, the associated ACS rack must have been upgraded with the Universal Repeater Board.

Series 200 Super Lamp Run Cable



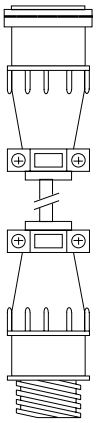
Due to data signal degradation, standard Series 200 lamp cables should not be connected for lengths greater than 100 feet. The super lamp run cable assembly can be run up to 500 feet and is recommended even for short runs of Virtuoso comm. This cable contains AC and data conductors carried on three conductor, two pair composite runs. Data are carried on two individually shielded pairs with a common drain wire. The conductor to shield capacitance of the twisted pair data conductors is very low, allowing the cable to be run for long distances with little signal degradation. This cable uses the same CPC connectors as those on Series 200 lamp runs.

There is a practical limit to the number of cables that can be combined before minor signal degradation occurs. *No more than four cables* should be strung together to maintain signal integrity. This limits the number of connections (major sources of noise) to five (three between cables and two at each end of string at equipment connection).

The cables are color-coded at each end to denote length: blue (100 feet), violet (150 feet), brown (185 feet), green (200 feet), and gray (250 feet).

Note: In order to use this cable properly, the associated ACS rack must have been upgraded with the Universal Repeater Board.

Series 300 Lamp Cable



Series 300 lamp cables have a 16-pin Amp CPC connector at both ends and come in two types: shielded and unshielded.

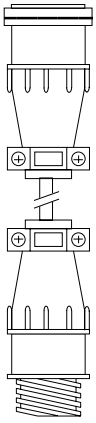
- The unshielded, gray-jacketed cables are used to connect VL5, VL5B, and VLM luminaires to Smart Repeater units.
- The shielded, black-jacketed lamp cables are used to connect VL5, VL5B, VL5Arc, VL6, VL7 and VLM luminaires to Smart Repeater/Smart Repeater Plus units. The shielded cable has an additional shield around the power conductors.

The cables are color coded at each end to denote standard lengths. For unshielded lamp cables: white (4 feet), red (8 feet), yellow (16 feet), orange (40 feet), and blue (100 feet). For shielded lamp cables: white (6 feet), red (12 feet), yellow (20 feet), orange (50 feet), blue (100 feet).

Maximum recommended length is indicated below:

Luminaire	Cable Length
VL5, VL5B, VL5Arc	300 ft.
VL6	150 ft.
VL6B, VL6C/VL6C+	70 ft.
VL7, VL7U, VL7B, VL7UB	32 ft.

Series 300 Smart Lamp Plus Cable



Series 300 Smart Lamp Plus cables have a 16-pin Amp CPC connector at both ends.

The shielded, black-jacketed lamp cables are used to connect VL6B and VL7 luminaires to Smart Repeater Plus units. The shielded cable has an additional shield around the power conductors.

The cables are color coded at each end to denote the two standard lengths: orange (50 feet), blue (100 feet).

Maximum recommended length is 100 feet.

Data Cables

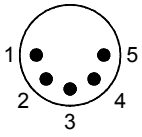
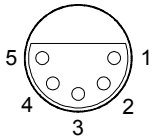
Smart Repeater and DMX200 units are equipped with 5-pin XLR connectors for DATA IN and DATA THRU (out) applications. DATA IN requires a 5-pin, female XLR connector and DATA THRU requires a 5-pin, male XLR connector. When purchasing or constructing data cables, it is important that not only the correct cable type be used, but also quality cable to ensure a reliable DMX512 system. Your cabling should meet the following USITT DMX512 specification requirements:

- Suitable for use with EIA485 (RS485) operation at 250k baud.
- Characteristic impedance 85-150 ohms, nominally 120 ohms.
- Low capacitance.
- Two twisted pairs.
- Foil and braid shielded.
- 24 AWG min. gauge for runs up to 1000 feet (300m).
- 22 AWG min. gauge for runs up to 1640 feet (500m).

Note: Microphone type cables and other general purpose, two-core audio or signal cables are not suitable for use with DMX512.

Refer to the USITT Recommended Practice for DMX512 guide for additional information regarding DMX512 systems. How to obtain a copy is detailed in "Additional Documentation" on page 1.

The XLR 5-pin connectors should be wired as follows:

Pin/Wire Code to XLR Connectors						
Data Thru Cable Pinout  Male Conn	**Pin 1** Foil & Braided Shield	**Pin 2** 1st conductor of 1st twisted pair Data (-)	**Pin 3** 2nd conductor of 1st twisted pair Data (+)	**Pin 4** 1st conductor of 2nd twisted pair Data (-)	**Pin 5** 2nd conductor of 2nd twisted pair Data (+)	Data In Cable Pinout  Female Conn

Recommended Cable Types/Manufacturers

These are only a few of the suitable cable types. Any quality EIA485, twisted pair, 120 ohm, shielded cable will also work.

Table 2-5: Cable Types/Manufacturers

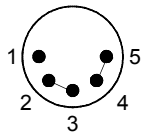
Type	Pairs	ZΩ*	Jacket	AWG	Use	Temp (F)
Belden Cables						
1215A	2	150	PVC	26	IBM Type 6 Office cable	75
1269A	2	100	PTFE	22 (Solid)	High Temp, Plenum cable	200
8102	2	100	PVC	24	UL2919	80
8132	2	120	PVC	28	UL2919	80
8162	2	100	PVC	24	UL2493	60
82729	2	100	PTFE	24	High Temp, Plenum cable	200
88102	2	100	PTFE	24	High Temp, Plenum cable	200
89696	2	100	PTFE	22	High Temp, Plenum cable	200
89729	2	100	PTFE	24	High Temp, Plenum cable	200
89855	2	100	PTFE	22	High Temp, Plenum cable	200
9729	2	100	PVC	24	UL2493	60
9804	2	100	PVC	28	UL2960	60
9829	2	100	PVC	24	UL2919	80
9842	2	120	PVC	24	UL2919	80
Proplex Cables						
PC224P	2	110	Polyurethane	22	Heavy Duty and Portable	105
PC224T	2	110	PVC	22	UL2464	105
PC226T	3	110	PVC	22	UL2464	

* Characteristic Impedance

Male Termination Connector

A male XLR termination connector is required at the last luminaire (or "far end of the line") to prevent signal reflections. Signal reflections may cancel out the signal at certain line lengths, resulting in errors. The terminator is also necessary for software downloads and running tests on multiple luminaires. To construct your own connector, you will need the following components:

- 5-pin, male XLR connector.
- Two 1/4W 5% 120 ohm resistors.



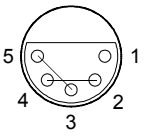
Solder resistors across pins 2 & 3, and 4 & 5

Loopback Connector

When transferring software versions from luminaire to luminaire, a loopback connector is required at the first luminaire in the data link.

To construct your own connector, you will need the following components:

- 5-pin, female XLR connector.
- Two small segments of 22AWG wire.



Solder wires across pins 2 & 4, and 3 & 5

3. System

This chapter contains information on set-up and checkout of the system.

- Equipment Handling
- Hanging
- Accessories
- System Hook-Up
- System Checkout

Equipment Handling

Lamps

Servicing

- When handling a lamp, hold it by the ceramic base while wearing cotton gloves or finger cots. Do not touch the glass envelope (bulb). If you touch the glass with bare fingers, wipe off any fingerprints with alcohol.
- Use care when opening and closing the rear door of the VL2B and VL2C luminaires. Any jarring of the rear door can undo the optical alignment of the lamp.

Heat

- When lamps are lit, the interior of the luminaires becomes very hot. To aid in the airflow circulation within the luminaires, after dousing the lamps, wait ten minutes before removing power to the luminaires. This will provide enough time for the equipment fan to cool off the unit.

Lamp Life

- When operating arc lamps, allow luminaires to operate for at least 3 minutes. It takes about 3 minutes for the fill components (mercury and halogen-metal compounds) in the lamp tubes to vaporize completely. If the lamps are switched off earlier than 3 minutes, the fill components are partially vaporized. The inadequately vaporized fill components and the electrode material (tungsten) are deposited in the areas of the lamp tubes that have remained cool. As a result, the lamp tubes blacken prematurely and reduce the service lives of the lamps.
- If system will be unattended for more than two hours, luminaire lamps should be doused. Standby mode should not be used for more than two hours.
- For VL6 luminaires, if lamp is struck, the luminaire should be maintained in a horizontal position when not in use.
- For arc lamp luminaires, heads should be tilted horizontal before starting lamps. Lamps generate light by an electrical discharge arc, whereby the electrons from two electrodes excite the fill components to give off light. Because of the alternating current "position", the electrons are alternately given off by the two electrodes. When a lamp is set in a vertical position, the halogen-metal compounds, which determine the color temperature of the lamp, collect at the top end of the glass envelope. When the lamp is started, color deviations occur since the concentration of halogen compounds is greater around the top electrode than the bottom electrode. In addition, the fill components that are difficult to vaporize congeal around the bottom electrode, thereby reducing lamp life.

Hanging

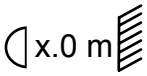
Hanging Preparation

Observe the following guidelines when installing truss equipment.

Luminaire Orientation and Placement

Luminaire hanging orientation is usually denoted on a lighting plot. A lighting plot is created in advance and represents the stage setup and desired location and orientation of luminaires.

Luminaires and repeaters are generally hung from pipes or trusses, and suspended above the object of illumination. Ensure that minimum distance safety requirements are observed. The minimum distance symbol can be found on the input rating label of luminaires and specifies the minimum safe distance from the front lens to a lighted object.



x.0 = number of meters

Luminaire input (pigtail) cables are used as reference points when hanging instruments. The hanging orientation of the luminaire on the truss or pipe determines which direction the luminaire will initially move from the luminaire zero position when the pan and tilt controls are manipulated from the console. All luminaires move to their zero position when they finish calibration (head and yokes half-way between stops). The input cables should have an order: all pointed stage left or stage right, or downstage luminaires one way and upstage luminaires the other. This allows the luminaires to move in a like manner when all luminaires are selected and moved at the same time.

Truss Pipe

Normally, Series 200 luminaires are hung with two truss hooks on a single pipe. Series 300 luminaires are hung with one double truss hook or clamp (VL7) on a single pipe. The hooks fit securely on any pipe with an outer diameter between 1 and 2 inches (25.40 to 50.80 mm). The clamp is designed for a 2 inch (50.80 mm) pipe. The use of square pipe is not recommended. Other truss-mounted equipment may only require one S200 truss hook. Truss hooks are clamped to the pipe (or truss) by turning the wing bolt, installed in one of two threaded holes. (The wing bolt should be tightened only by hand.)

Spacing Requirements

To avoid collisions during pan and tilt movement, luminaires must be installed at a minimum distance from each other.

Table 3-1: Luminaire-To-Luminaire Distance Requirement

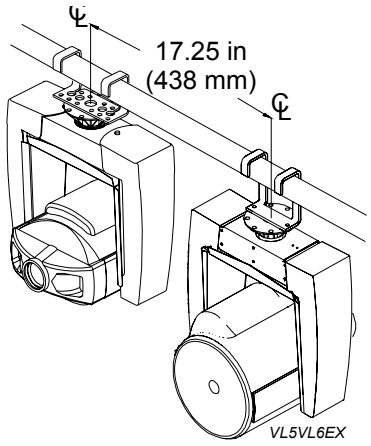
Luminaire Type	VL2B / VL2C	VL4	VL5 / VL5B / VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U / VL7B / VL7UB	VLM
VL2C	21.50 in 546 mm	19.50 in 495 mm	19.75 in 502 mm	19.00 in 483 mm	20.25 in 515 mm	23.75 in 603 mm	19.50 in 495 mm
VL4	19.50 in 495 mm	17.50 in 445 mm	17.75 in 451 mm	17.00 in 432 mm	15.25 in 388 mm	21.75 in 552 mm	17.50 in 445 mm
VL5 / VL5B / VL5Arc	19.75 in 502 mm	17.75 in 451 mm	18.00 in 457 mm	17.25 in 438 mm	18.5 in 470 mm	22.00 in 559 mm	17.75 in 451 mm
VL6	19.00 in 483 mm	17.00 in 432 mm	17.25 in 438 mm	16.50 in 419 mm	17.75 in 451 mm	21.25 540 mm	17.00 in 432 mm
VL6B / VL6C / VL6C+	20.25 in 515 mm	15.25 in 388 mm	18.5 in 470 mm	17.75 in 451 mm	19.00 in 483 mm	22.5 in 572 mm	18.25 in 464 mm
VL7 / VL7U / VL7B / VL7UB	23.75 in 603 mm	21.75 in 552 mm	22.00 in 559 mm	21.25 540 mm	22.5 in 572 mm	26.00 660 mm	21.75 in 552 mm
VLM	19.50 in 495 mm	17.50 in 445 mm	17.75 in 451 mm	17.00 in 432 mm	18.25 in 464 mm	21.75 in 552 mm	17.50 in 445 mm

Example: Find minimum distance between a VL5 luminaire & a VL6 luminaire:

Step 1. On chart above, locate VL6 luminaire on top row and locate VL5 luminaire on side row.

Step 2. From VL6 block on top row, follow chart down. From VL5 block on side row, follow chart to right.

Step 3. Where two rows meet, locate the correct minimum distance (17.25 in. or 438 mm).



Safety Cables

A safety cable is provided with every luminaire and repeater. There are two different safety cables available: the Series 200 cable and Series 300 cable. The cable is attached to the handle of Series 200 luminaires or the pan tube of Series 300 luminaires, looped around the truss or pipe, then re-attached to the equipment. As little slack as possible should be left.

WARNING: Safety cables should always be used when hanging luminaires.

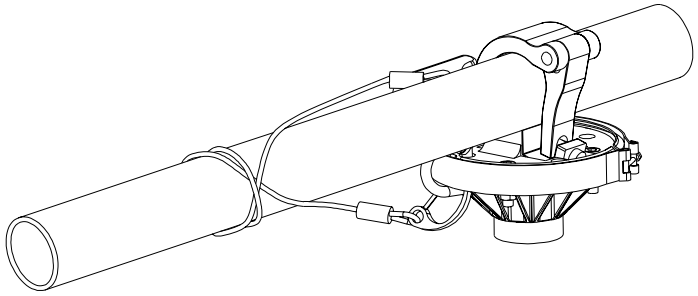


Figure 3-1: Safety Cable Example

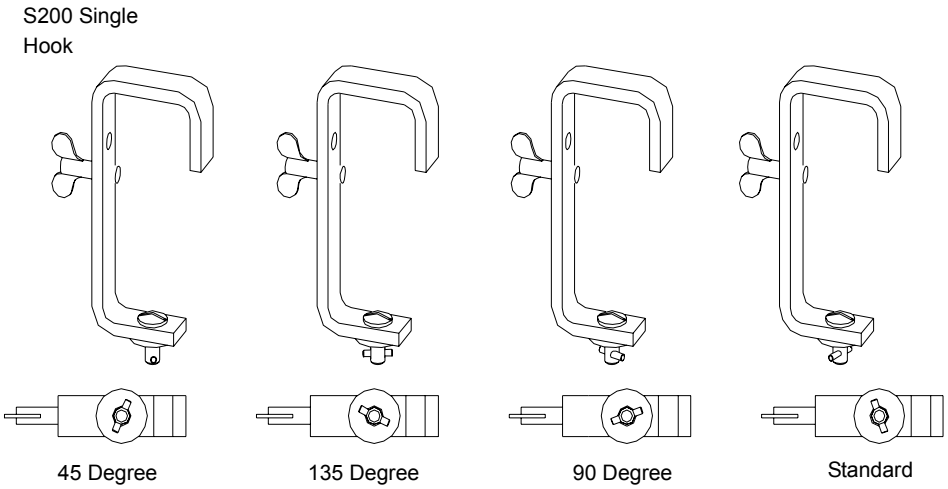
Series 200 Hanging Hardware

All Series 200 luminaires and repeaters are provided with truss hooks and a safety cable.

CAUTION: The wing bolt should be tightened only by hand. Do not use wrenches or other tools as this can damage the truss or the hook.

Single Truss Hook Variations

The Series 200 luminaires (VL2/VL4) and repeaters use the single truss hook. Multiple variations of the hook are available to accommodate a wide variety of installation configurations.



While the hanging methods for repeaters are limited to either a one- or two-hook hang, luminaires offer greater hanging flexibility.

Note: Refer to "Series 200 Hanging Methods" on page 61 for hook placement illustration.

The VL2C luminaire has five receptacles for connecting truss hooks.

- Standard hooks in opposite corners are parallel.
- Standard hooks in adjacent corners are at right angles.
- A standard hook in the center receptacle is parallel to two of the corners and at a right angle to the other two.
- A 90 degree hook is available so adjacent hooks can be parallel.
- The 45 and 135 degree hooks allow the luminaire to be hung square with the truss pipe.

The VL4 luminaire has four receptacles for connecting truss hooks. Like the VL2C luminaire, standard hooks on opposite sides are parallel, while standard hooks on adjacent sides are at right angles.

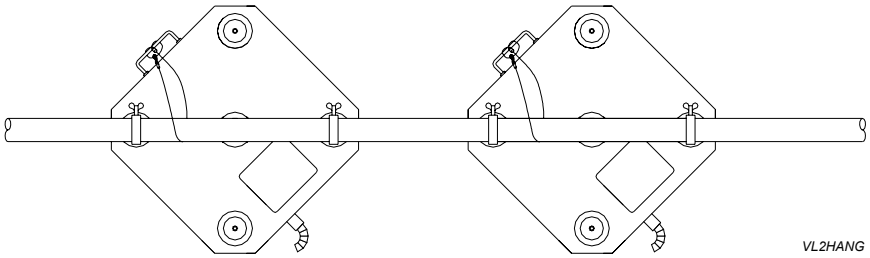
The hook is inserted in the receptacle and turned 90 degrees clockwise to lock. To re-orient the hook 180 degrees, remove the truss hook, turn it 180 degrees around and re-insert the hook. When installing the truss hooks, never turn the hook more than 90 degrees, as this will damage the receptacle.

Series 200 Hanging Methods

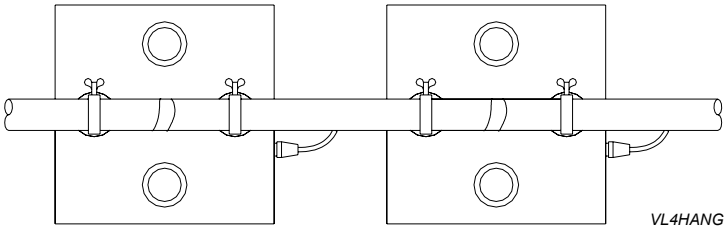
Series 200 Two-Point Hang (Standard)

A two-point hang is the standard hanging method for Series 200 luminaires.

VL2C Luminaire

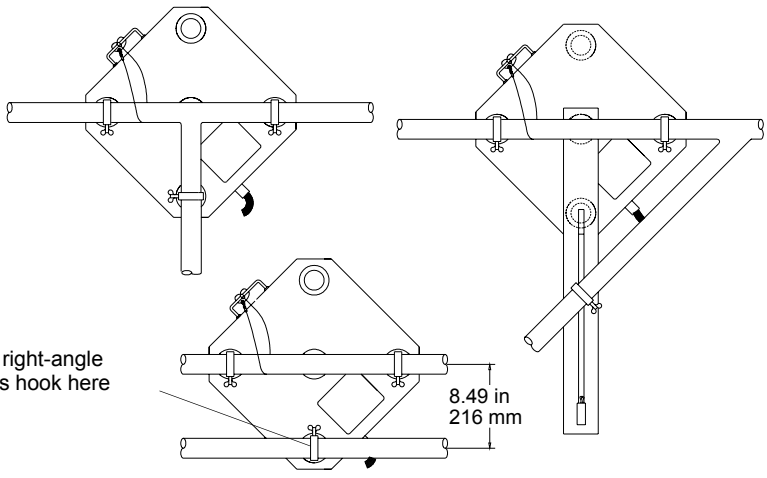


VL4 Luminaire



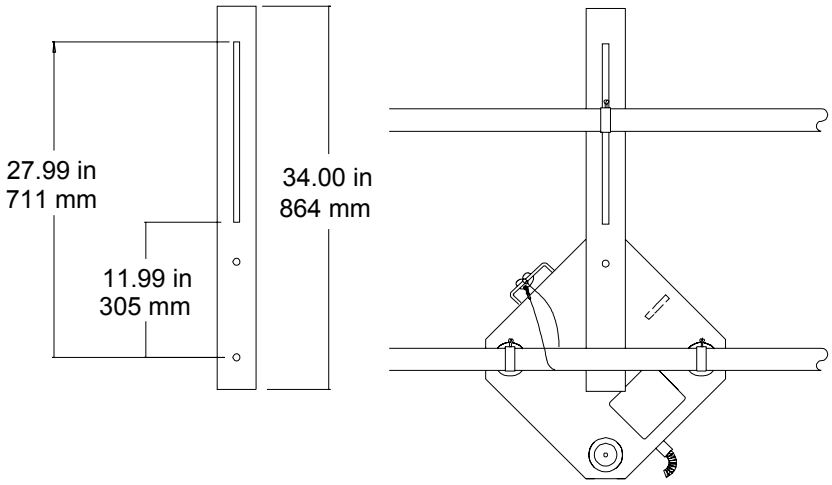
Series 200 Three-Point Hang

A three-point hang is required when the trusses move or tilt in any way during the show. This method of hanging prevents the luminaires from slipping or twisting on the truss and thereby altering their focus. In some cases a cross-brace and a third truss hook can be used, but in most cases an adjustable truss coupling plate will be required.



Adjustable Coupling Plate

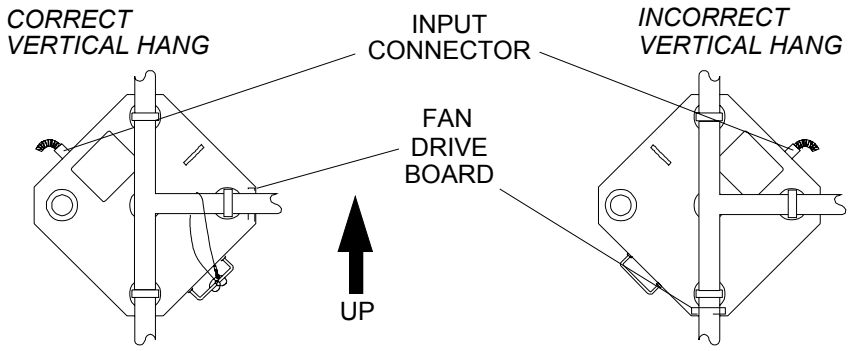
The most widely used device for extra support is the adjustable coupling plate. The adjustable coupling plate provides a third point of support. The hook can be moved along a slot in the plate to accommodate trusses with 12- to 28-inch centers. The hook can also be rotated through 360 degrees to mate with cross braces at any angle. A special hook used with the adjustable coupling plates utilizes a bolt welded in place of the truss hook fastener. This hook is secured to the coupling plate by a lock washer and nut.



The adjustable coupling plate can be installed in two locations on VL2C and VL4 luminaires. This limits the overhang of the coupling plates from the truss, thereby reducing the hazard when moving the truss during installation and removal.

Series 200 Vertical Hang

In some cases it is necessary to hang the luminaires vertically. In such a case, the luminaire is hanging on its side with the yoke parallel to the stage. This puts more stress on the yoke and the truss hooks than a normal, horizontal hang. A three-point hang is absolutely necessary for vertical hangs, whether or not the truss moves during the show. When hanging a VL2C luminaire in a vertical hang position, make sure that the luminaire is hung so that the fan drive board is not at the lowest point of the hang. This will prevent rain water or heavy condensation from collecting around the bottom of the luminaire (where the board would be located) and causing possible luminaire overheating.



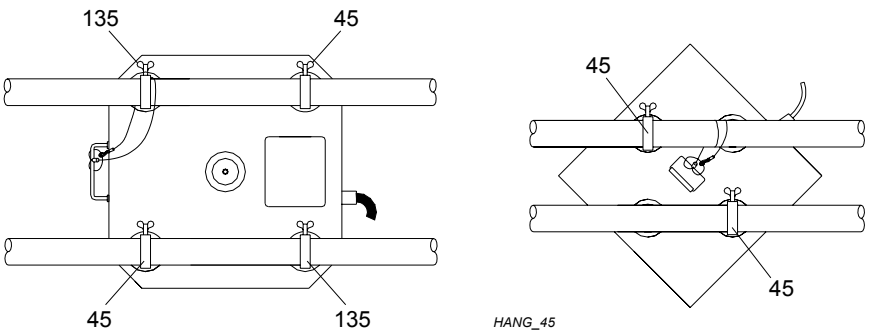
Series 200 Alternate Hanging Methods

Multiple variations of the truss hook (refer to "Single Truss Hook Variations" on page 60) are available to accommodate a wide variety of installation configurations. The following illustration shows how different style hooks align in the Series 200 luminaire chassis.

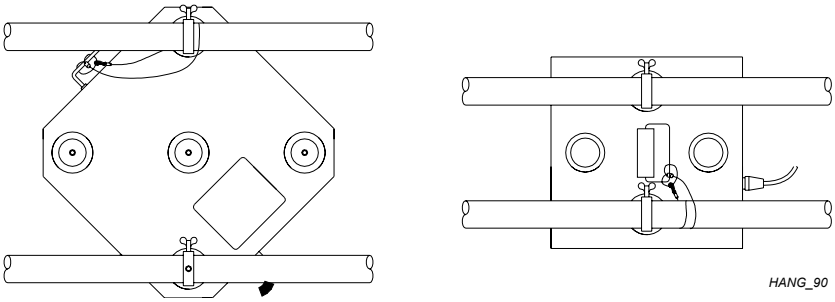
The following illustrations give a few examples of installation using alternate truss hooks.

Note: There are many more methods of hanging luminaires that are not discussed here, as well as types of hooks and coupling plates for special applications. The following diagrams are only a few examples of alternate hanging methods. Consult your local Product Support Department or shop manager if necessary.

Hang Using 45 and 135 Degree Hooks



Hang Using 90 Degree Hooks



HANG_90

Series 300 Hanging Hardware: VL5 / VL6 / VLM

All VL5, VL6, and VLM luminaires are provided with a truss hook and a safety cable.

Series 300 luminaires can be hung horizontally or vertically from any structure designed to accommodate the load created by this moving luminaire. In standard hanging applications, the DMX512 utilizes a Series 300 double truss hook, which is bolted to the pan tube. The hook can be oriented in 45 degree increments to provide flexible mounting. (See "Standard Hang" on page 66.)

A special third-point truss hook, which mounts to the pan tube in addition to the double hook, is available to provide a third point of support. (See "Three-Point Hang" on page 68.)

To attach a double truss hook:

Step 1. Determine type of installation and required orientation of truss hook.

Step 2. At pan tube, attach truss hook using four 5/16-18 x 1" bolts and 5/16-18 nuts (Figure 3-2).

Step 3. Ensure truss hook is secure.

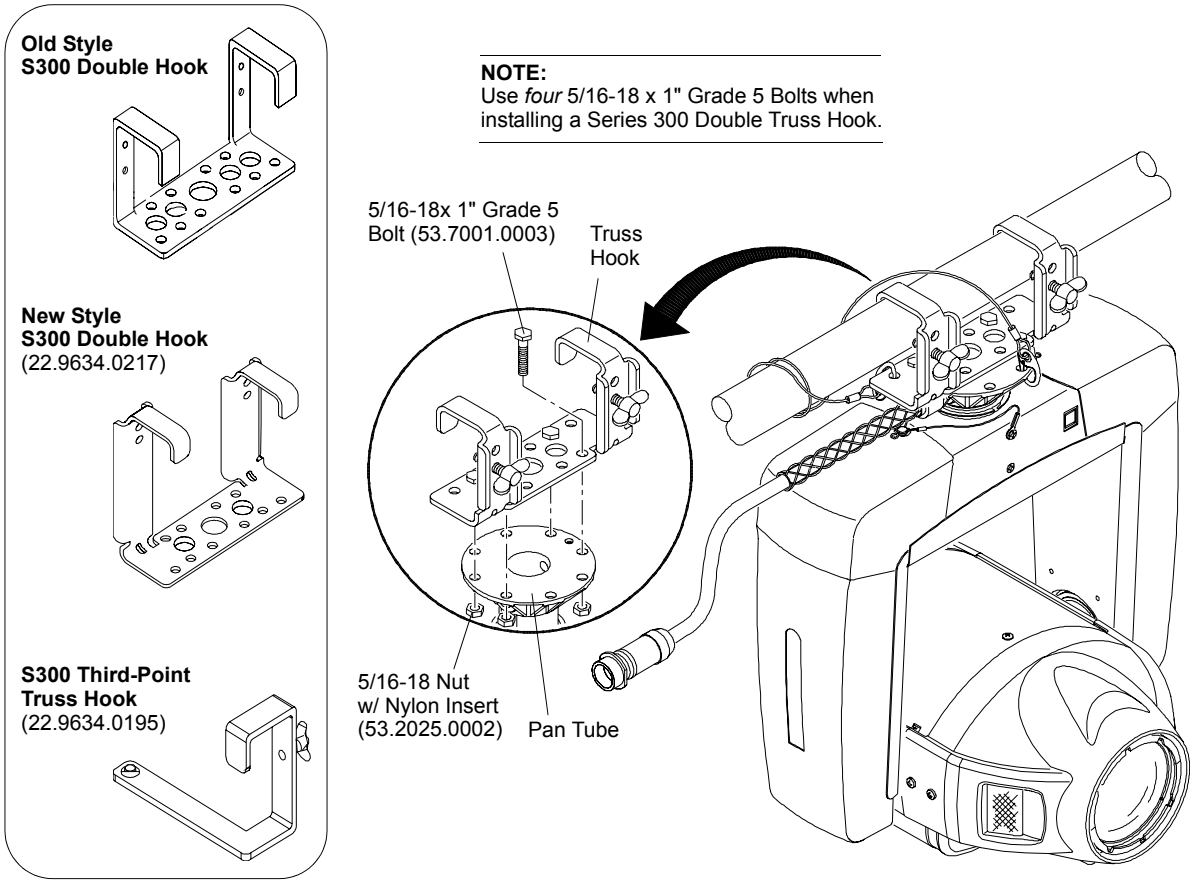


Figure 3-2: Attaching a Series 300 Truss Hook (VL6C+ Example)

Hanging Methods: VL5 / VL6 / VLM

Standard Hang

In standard hanging applications, the VL5, VL6, and VLM luminaires utilizes a Series 300 double truss hook, which is bolted to the pan tube and affixed to square tube or round pipe; the minimum outside dimension for a piece of pipe or tube is 1 inch (2.54 cm) and the maximum outside dimension is 2 inches (5.08 cm).

CAUTION: Wing bolts should be tightened only by hand. Do not use wrenches or other tools as this can damage the truss or the hook.

WARNING: A safety cable MUST be used in all hanging configurations.

Step 1. Lift luminaire into mounting position (Figure 3-3 on next page).

Step 2. Tighten truss hook wing bolts by hand. Ensure that luminaire is fully supported.

Step 3. Install safety cable as follows (referring to Figure 3-3 DETAIL A):

a. Attach one end of safety cable to pan tube.

b. Loop several times around truss or pipe, leaving as little slack as possible.

c. Attach other end of safety cable to pan tube.

Step 4. Connect input pigtail cable to Series 300 Lamp Run Cable which is connected to a Smart Repeater or Smart Repeater Plus unit.

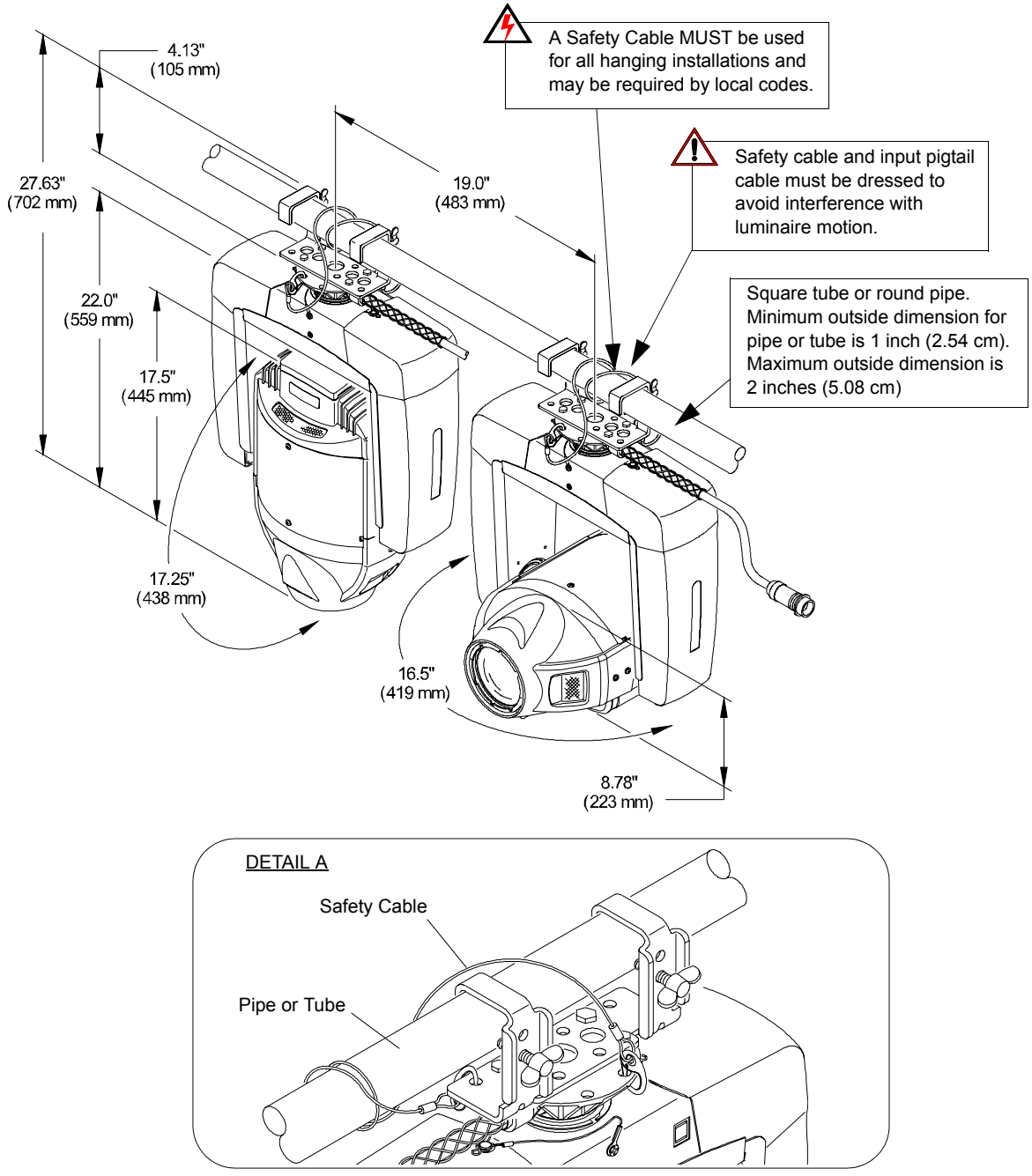


Figure 3-3: Standard Series 300 Hanging Configuration and Clearances (VL6C+ Example)

Three-Point Hang

A Series 300 third-point truss hook can be used to stabilize the luminaire in a three-point hanging configuration. The third-point hook is bolted to the pan tube in addition to the standard double hook. The following illustration shows how the hook is used to achieve a three-point hang.

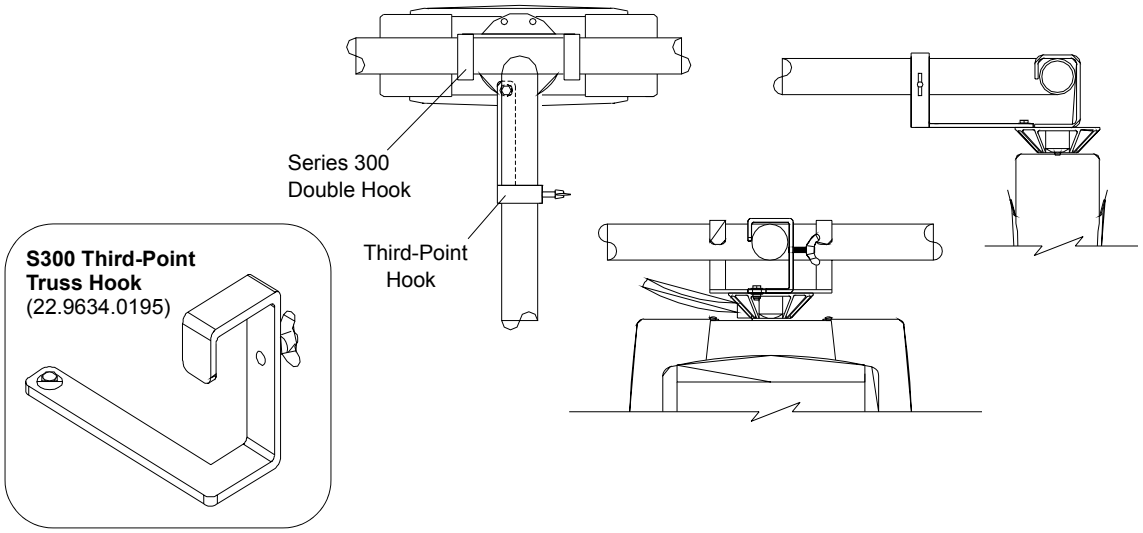


Figure 3-4: Three-Point Hang

Custom Hang

Series 300 luminaires can also be hung using custom hanging devices. The pan tube's multiple mounting holes allow flexibility for placement of hardware. To attach custom hanging devices to the pan tube, the following hardware can be used:

- 5/16"-18 x 1" HSCZ Grade 5 Bolt (53.7001.0003)
- 5/16"-18 Zinc nut with nylon inserts (53.2025.0002)

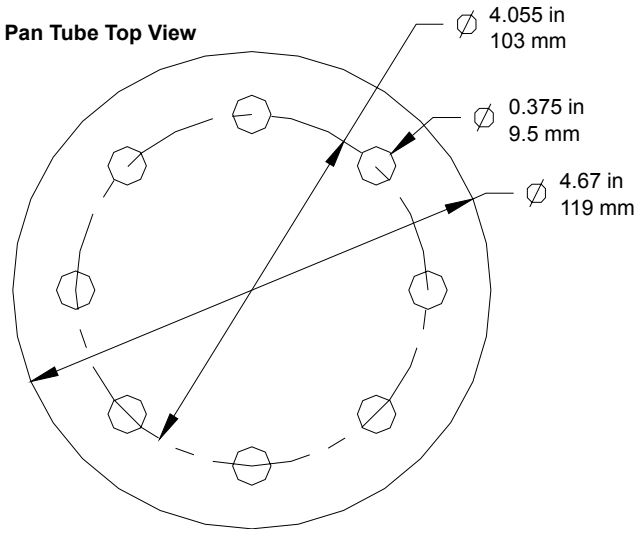


Figure 3-5: Series 300 Pan Tube Hole Dimensions

Series 300 Hanging Hardware: VL7

The VL7 luminaire requires a different type of truss attachment hardware than the other Series 300 luminaires. For the VL7 luminaire, two types of clamps are available: a round pipe clamp for 2" pipe applications and an adjustable clamp for square pipe or other applications. A single truss clamp, attached to the pan tube, is used for a standard horizontal hang. A vertical hang can be achieved using an appropriate vertical hang assembly in combination with a truss clamp.

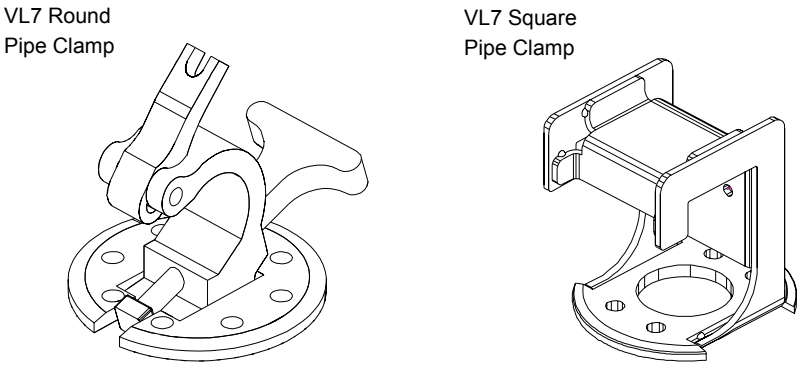


Figure 3-6: VL7 Clamps

When installing a VL7 luminaire with the round pipe clamp, swing latch up and back as far as possible. If the latch is not in the proper position, the clamp will not fit on the pipe.

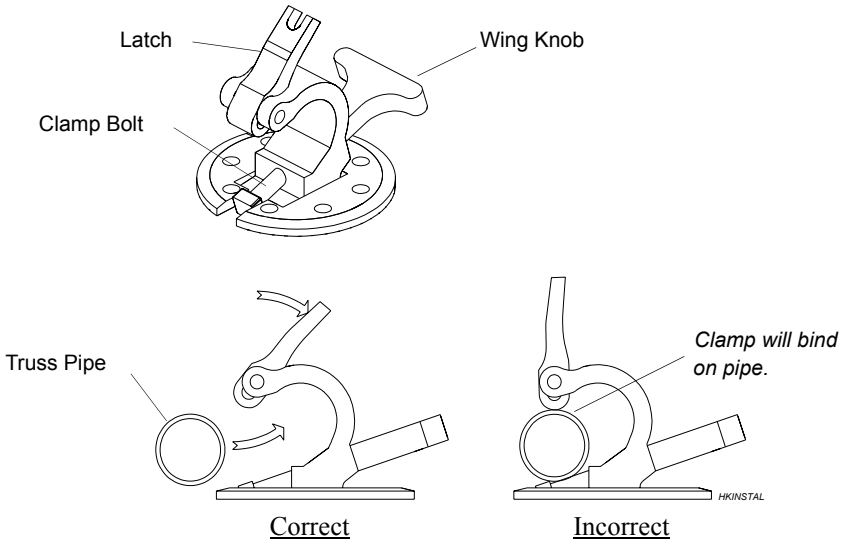


Figure 3-7: VL7 Round Pipe Clamp Orientation

VL7 Vertical Hang Assemblies

A special vertical hang can be achieved by using a vertical hang assembly. This assembly consists of several components that attach to the truss clamp. Depending on the truss clamp, round pipe or adjustable (square pipe), a different vertical hang assembly will be required.

Round Pipe Vertical Hang

The Round Pipe Vertical Hang Assembly (21.9650.4115) utilizes a 2" round pipe truss clamp, an adapter, a support tube, and a standard Series 300 double truss hook. When assembled with U-Bolts and attached to the VL7 pan tube, a supported vertical hang on 2" round pipe can be obtained as shown.

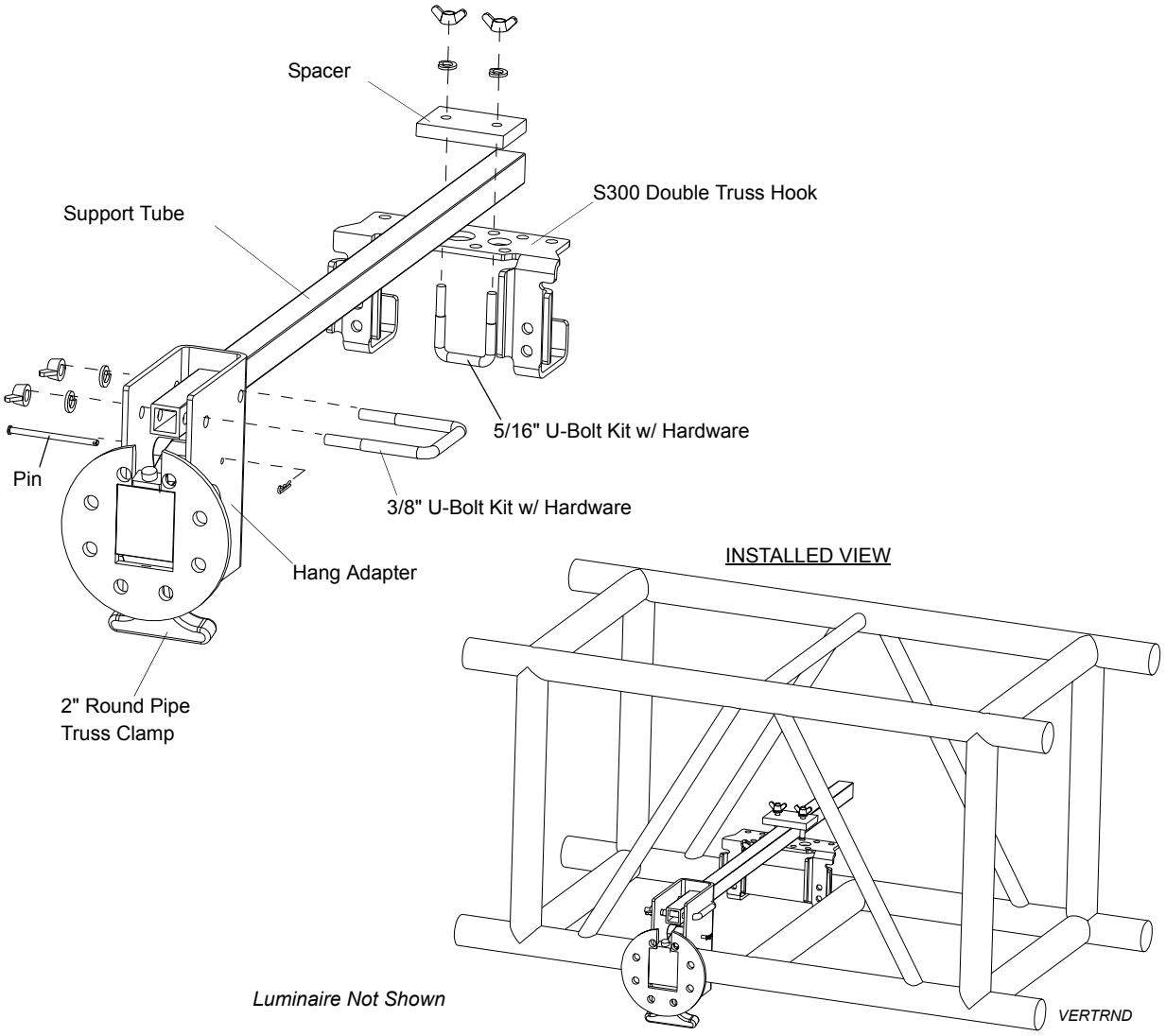


Figure 3-8: VL7 Vertical Hang - Round Pipe

Square Pipe Vertical Hang

The Square Pipe Vertical Hang Assembly (21.9650.4114) utilizes an adjustable square pipe truss clamp, a support tube, and a standard Series 300 double truss hook. When assembled with U-Bolts and attached to the VL7 pan tube, a supported vertical hang on square pipe or round pipe larger than 2" diameter can be achieved as shown.

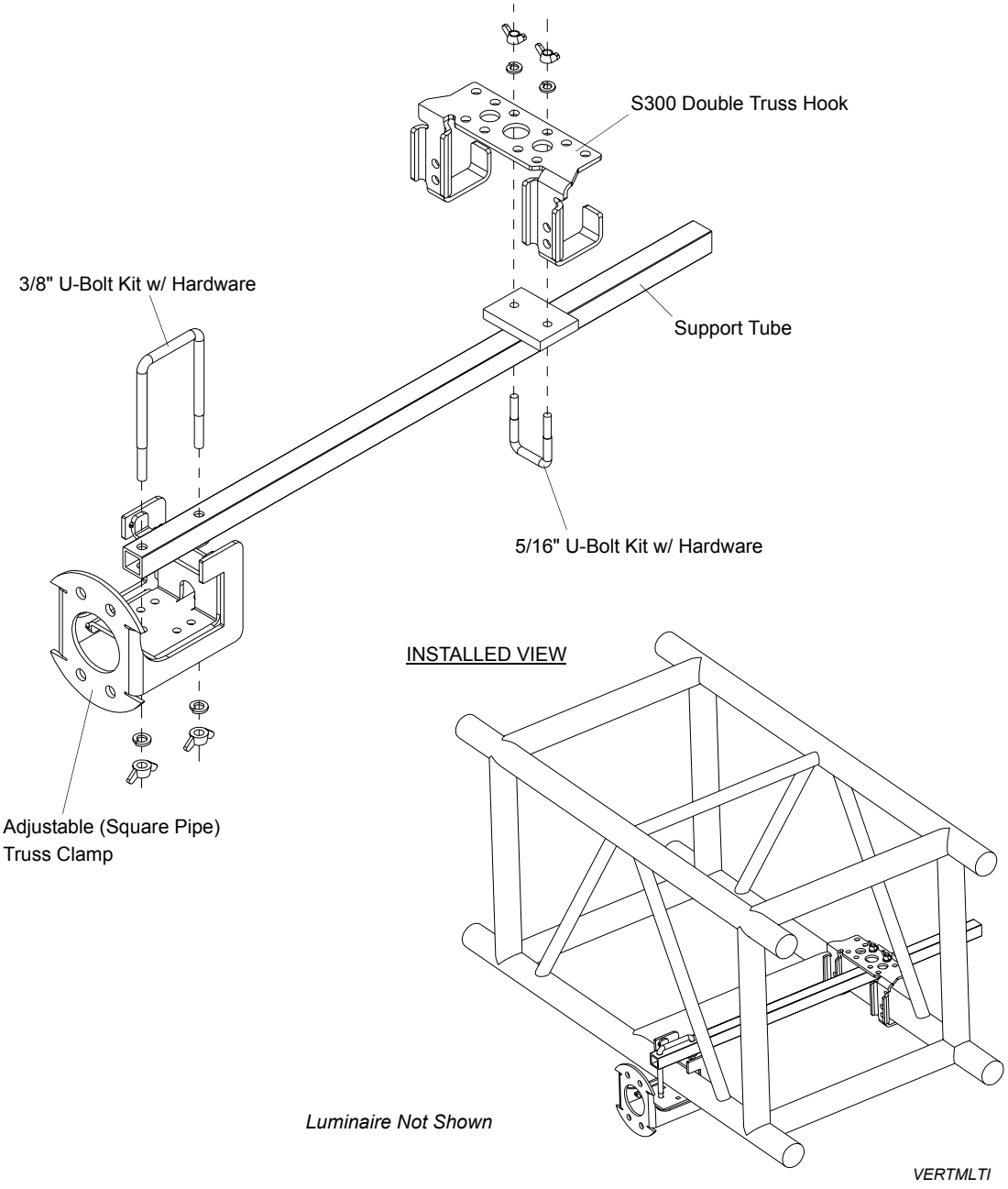


Figure 3-9: VL7 Vertical Hang - Square Pipe

Series 300 Floor Mounting

A Series 300 luminaire may be mounted in an upright floor position using a Series 300 floor stand. The floor stand (22.9634.0161) includes all necessary hardware as shown in Figure 3-10.

To install floor stand:

Step 1. Orient pigtail cable as shown in Figure 3-10 DETAIL B and rotate pan tube accordingly.

Step 2. Secure pivoting legs to pan tube using, on each pivoting leg, one 5/16-18 bolt and nut; with two clutch disc springs, and one 1/4" flat washer between the bolt and the leg, one 1/4" flat washer between the leg and the pan tube. *Be sure to install disc springs with concave surfaces facing the flat washer.*

Step 3. Tighten nuts and bolts until there is proper tension: just enough so pivoting legs stay in place, but not so much that the legs don't pivot. See Figure 3-10 DETAIL A.

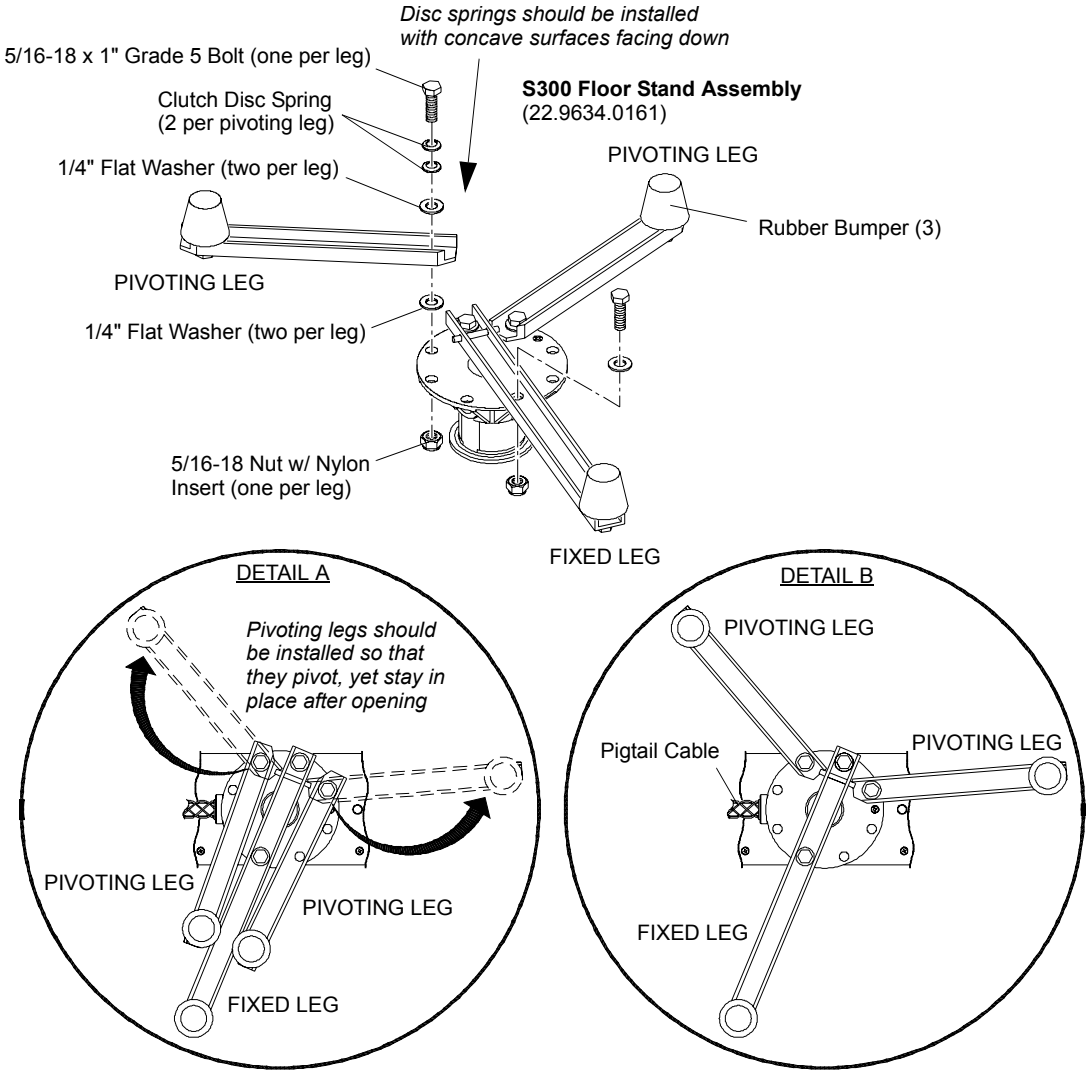


Figure 3-10: Installing Floor Stand

Step 4. Place luminaire in desired floor position observing proper clearances.

Step 5. Connect input pigtail cable to Series 300 Lamp Run Cable which is connected to a Smart Repeater or Smart Repeater Plus unit.

Accessories

Sound Baffles

Some hang locations require a reduced noise environment. Fan noise in the VL7 luminaire and Series 200 luminaires can be greatly reduced by using the VL7 sound baffle kit, the VL2C sound baffle (with or without sound blanket) and VL4 sound baffle.

No additional hardware is used to secure the sound baffles to the luminaires when the luminaires are hung from trusses. The Series 200 sound baffles are secured to the luminaire with safety cables. For ground installations, safety cables are not required. The VL7 sound baffle mounts over the top head cover. For all uses of the sound baffles (and sound blanket), the baffle fits over the fan opening and air filter. Note the following:

- It is not necessary to remove the air filters from VL2C luminaires.
- It may be necessary to remove the air filters from VL4 luminaires in some cases.

VL7 Luminaire Sound Baffle

The VL7 sound baffle is a two piece kit consisting of the baffle itself which mounts over the top head cover and is secured with elastic cords that wrap around the head assembly; and a thin counterweight required to be installed inside the bottom cover to balance the head assembly.

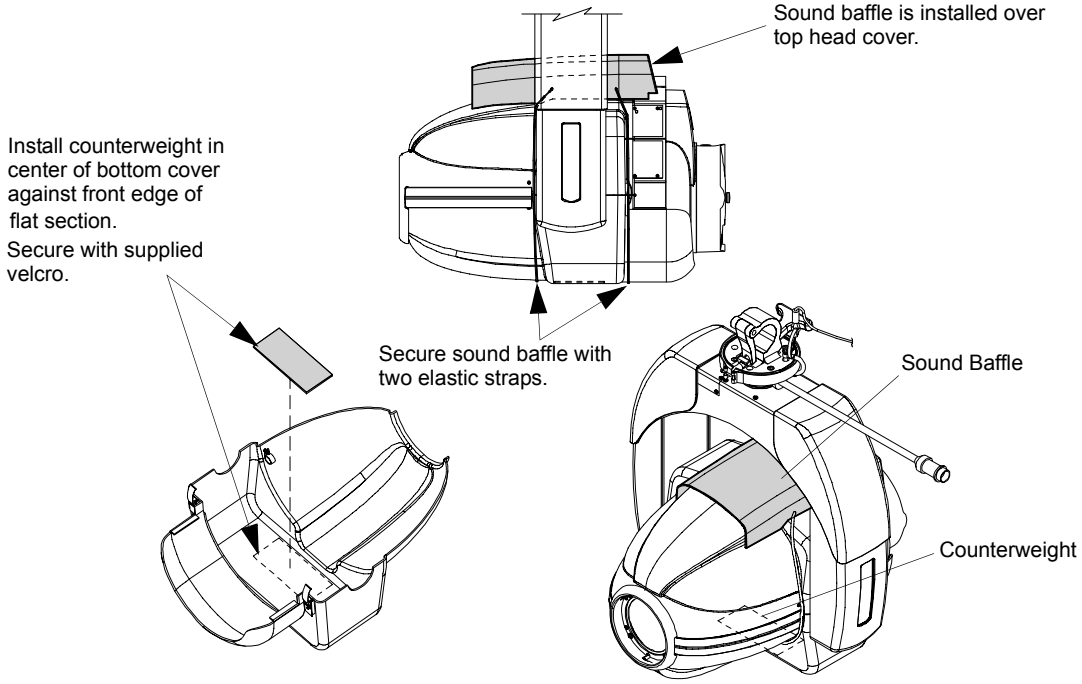


Figure 3-11: Installing VL7 Sound Baffle

To install the optional sound baffle kit:

Step 1. Disconnect power to luminaire.

Step 2. Disconnect two latches and remove bottom head cover.

Step 3. Install counterweight as shown in illustration.

Note: The counterweight is secured to the inside of the bottom head cover with adhesive-backed velcro. Both hook and loop velcro pieces are pre-installed on one side of the counter-weight.

---

a. At bottom of counterweight, remove adhesive backing from velcro. Leave velcro attached to counterweight.

b. Inside bottom cover, at flat section, center counterweight left and right and install against front edge. Press firmly to adhere velcro to bottom cover.

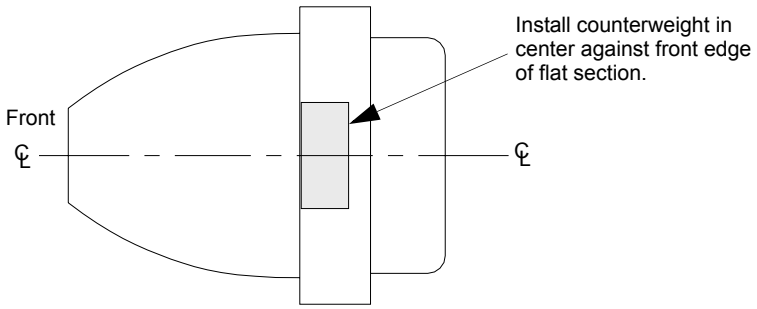


Figure 3-12: Installing VL7 Sound Baffle Counterweight

Step 4. At head assembly, install bottom head cover and secure latches.

Step 5. Install sound baffle.

a. Place baffle over top head covers.

b. Stretch elastic cords around front and rear sections of head assembly.

VL2C Luminaire Sound Baffle and Sound Blanket

The original VL2C sound baffle was modified from a rectangle to a truncated rectangle so that the luminaire will fit on a stage truss with little interference to other equipment. In addition, a sound blanket was designed to fit over the luminaire upper enclosure and sound baffle to provide additional sound isolation. It is a two piece plastic shell with an inner foam lining and attaches to the luminaire with two side buckles and three nylon straps with buckles. The sound blanket can only be used with the truncated rectangle sound baffle. The older style rectangular sound baffle can still be used without the sound blanket. Kits are available to convert rectangular sound baffles to truncated sound baffles. The modified sound baffle and sound blanket were designed primarily for the VL2C luminaire's louder cooling fan.

VL2C Sound Baffle

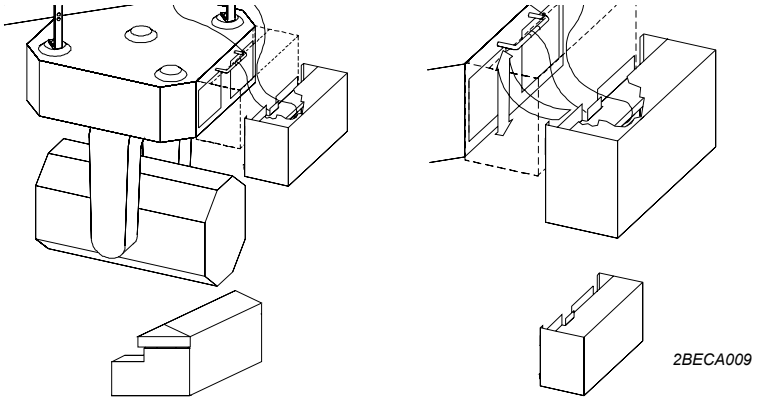


Figure 3-13: VL2C Sound Baffles

To install VL2C sound baffle:

Step 1. Route safety cable around center flange of sound baffle.

Step 2. Align sound baffle with air intakes.

Step 3. Push up center flanges of baffle into space between fan intakes and air filters.

Step 4. Push down bottom flanges of baffle into space between fan intakes and air filters.

Step 5. Ensure baffle fits snugly.

VL2C Sound Blanket

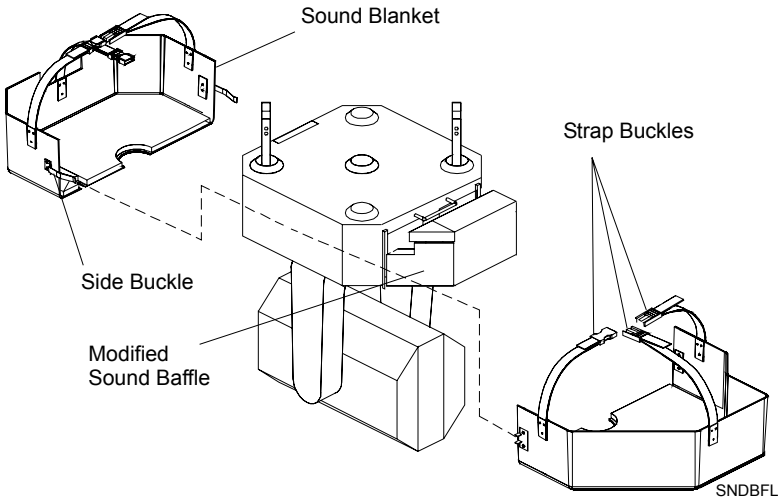


Figure 3-14: VL2C Sound Blanket Installation

To install VL2C sound blanket:

Step 1. At sound blanket, unlatch buckles from straps and buckles from side of baffle shell.

Step 2. At luminaire, place sound blanket shells on luminaire and snap strap buckles.

Step 3. At each side of sound blanket, secure side buckles.

Note: It may be necessary to add a piece of gaffer's tape at the joint between the two halves to stop the yoke from catching.

VL4 Sound Baffle

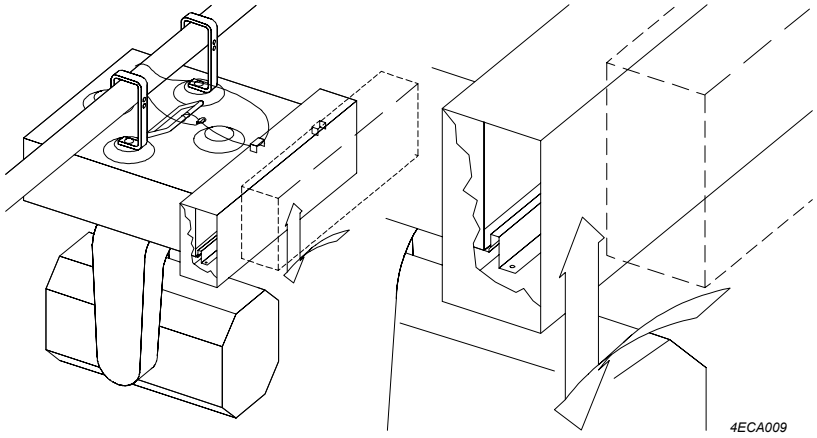


Figure 3-15: VL4 Sound Baffle

To install VL4 sound blanket:

Step 1. Route safety cable through eyelet in sound baffle.

Step 2. Align sound baffle with air intakes.

Note: Because of the baffle's tight fit, it may be necessary to remove the air filters before installation in some cases.

Step 3. Push down bottom flanges of baffle between bottom lips of fan intakes and air filters (if installed).

Step 4. Push up top flanges of baffle between top lips of fan intakes and air filters (if installed).

Step 5. Ensure that baffle fits snugly.

System Hook-Up

Overview

This section contains a quick guide to safe and proper system installation. Each series of luminaires has its own section on installation and checkout. For installation information, see the following sections:

- "Series 200 Luminaires" on page 80
- "Series 300 Luminaires" on page 84

These instructions are intended for persons already familiar with VARI✻LITE® equipment.

Note: Some of the terms found in this section are fully explained in the remainder of this manual. For a brief definition, refer to the "Glossary" on page 159.

Fixture Orientation

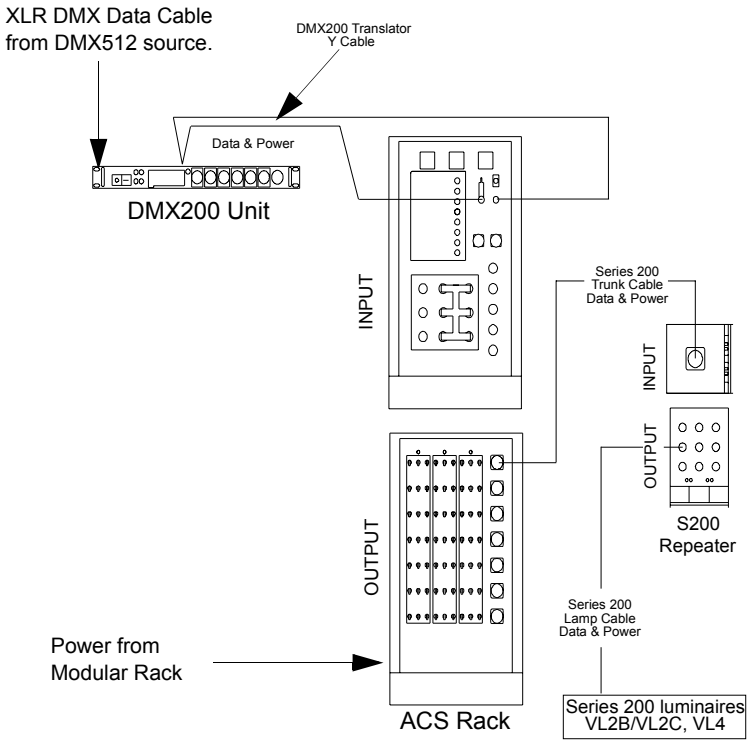
The orientation of the fixture is determined by which way the pigtail faces as it exits the luminaire. The way a fixture is hung affects the direction it will point when it reaches its stop mechanism. If one luminaire is hung differently from the others, the position (focus) will also be different. There should be some consistent order to the way the pigtail faces: all stage left, all stage right, etc.

Series 200 Luminaires

Refer also to "DMX512 System Example" on page 7.

Connecting to System

Series 200 luminaires will require a DMX200 interface unit in order to control them from DMX512 consoles.



Step 1. Locate house AC service.

a. Determine location of main power service where lighting system will be connected.

b. Verify with a qualified electrician (see WARNING above) that house AC service is within system operating voltages: 85 - 130 VAC or 170 - 260 VAC, single or three phase, 50 or 60 Hz. Ensure that house service can accommodate connecting 2/0 pig tails or 8/5 cables to house service lugs.

Step 2. Position ACS, Mini-ACS, or SixPack chassis delta/we switches to correct setting.

Refer to "Configuring Equipment For Delta or Wye Operation" on page 20.

Step 3. Tie in 2/0 or 8/5 tails.

a. Remove power from house service or verify that service disconnect switch is in the OFF position.

b. Have a qualified electrician connect 2/0 or 8/5 pig tails to house service.

Step 4. Attach line disconnects to pig tail cable.

a. Verify circuit breaker is in "off" position before installing line disconnect(s).

b. Connect line disconnect(s) to end of AC tails (2/0 or 8/5). (Line disconnects should be easily accessible in case emergency requires shutting off power to system.)

Step 5. Attach Bucking Transformer (if required).

If house AC service is below 100 VAC or above 240 VAC (Europe, Japan and Australia), it may be necessary to connect Bucking Transformer between pig tails and lighting system ACS or modular racks to reduce or raise voltage to desired level. (A standard Bucking Transformer accepts only Cam-Lok style connectors.)

Step 6. Run additional AC feeder cables to rack location(s).

Connect additional lengths of 2/0 or 8/5 feeder cable to extend power to location of ACS rack(s), modular rack(s), or conventional dimmer area.

Step 7. Make sure that Cam-Lok connections are tightly secured.

High voltage is present, careful preparation should be taken.

Step 8. Connect ACS, Modular or Mini-ACS Racks to feeder cables.

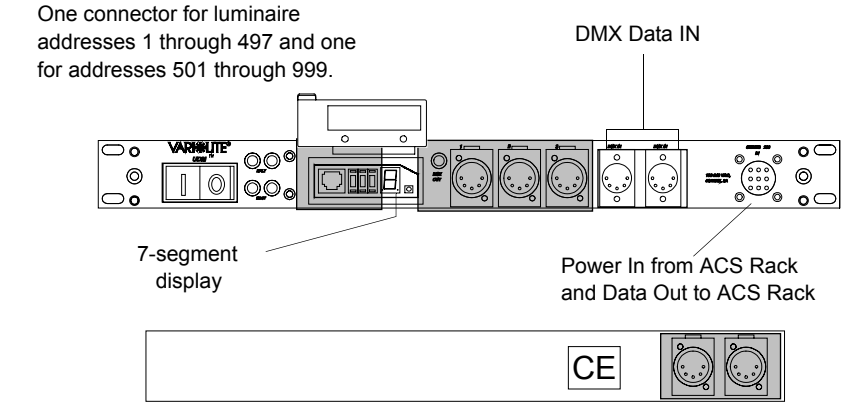
Connect cables securely to proper input connectors.

Step 9. Connect DMX200 unit to ACS rack.

a. Install DMX200 interface on rack or other suitable enclosure.

b. Connect DMX200 translator Y cable from DMX200 Power In/Data Out to ACS rack Power Out and Data In.

c. Connect DMX input cables to five-pin XLR, DMX IN ports as needed. One connector for luminaire addresses 1 through 497 and one connector for addresses 501 through 999.



Shaded items not used on DMX200 interface unit.

Note: If only one universe of DMX512 is required, ensure that the XLR connector is connected to DMX512 input number one (on left).

Step 10. Hang luminaires.

a. Determine hanging orientation of luminaires (refer to "Luminaire Orientation and Placement" on page 57). Ensure the following:

1) Pipe for mounting luminaires is between 1 and 2 inches (25.40 to 50.80 mm) in outer diameter.

2) The structure is secure and capable of supporting total luminaire load.

3) Sufficient clearance space is provided for each luminaire.

Note: It is recommended that all luminaire input connectors be orientated facing stage left, or at least in the same direction by hanging position.

---

b. Attach truss hooks (turn quarter-turn fastener clockwise). Do not over-turn quarter-turn fastener or truss hook receptacle assembly may be damaged.

c. Set thumbwheel address to DMX starting address for the luminaire.

Note: The VL2C luminaire requires 14 channels per luminaire, and the VL4 requires 15 channels per luminaire.

Luminaire addresses are usually decided upon prior to the set-up of equipment. The lighting plot may contain this information.

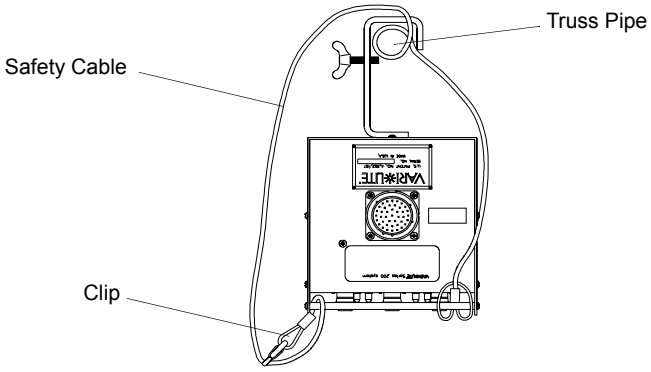
Step 11. Hang Repeater Boxes.

Note: When hanging a repeater, hang so that the red and green comm LED indicators will be visible to the tech, not the audience, when the truss is raised (at trim).

---

a. Attach Repeater Boxes to pipe or truss using Series 200 truss hooks (turn quarter-turn fastener clockwise). Refer to "Series 200 Hanging Hardware" on page 60 for more information. Do not over-turn quarter-turn fastener or truss hook receptacle assembly may be damaged.

b. Attach safety cable to Repeater Box handle and verify that the unit is securely fastened to pipe or truss.



Step 12. Connect Series 200 trunk cables.

a. Connect plug end of Series 200 trunk cables to ACS or mini-ACS rack trunk cable outputs.

b. Connect receptacle end to Repeater Box.

Step 13. Connect Series 200 lamp cables.

a. For Series 200 luminaires, attach plug end of Series 200 lamp cable to Repeater Box output. Remember to phase-balance Repeater Box. Refer to "Phase Balancing" on page 21.

b. Connect receptacle end of lamp cable to luminaire. Make sure to use correct length of lamp cable to avoid having too much excess. Avoid using many short lamp cables connected together since the more interconnections that exist, the more noise and maintenance problems that may develop.

Step 14. Perform final inspection.

Ensure that all components are securely connected and that all hanging equipment's safety cables are in use. Ensure that cabling is routed safely.

Step 15. Perform system checkout and troubleshooting.

For more information see "Series 200 Checkout" on page 90.

Series 300 Luminaires

Refer also to "DMX512 System Example" on page 7.

Connecting to System

Series 300 luminaires require a Smart Repeater unit for power and control by DMX512 consoles.

Step 1. Position SixPack chassis delta/wye switches to correct setting.

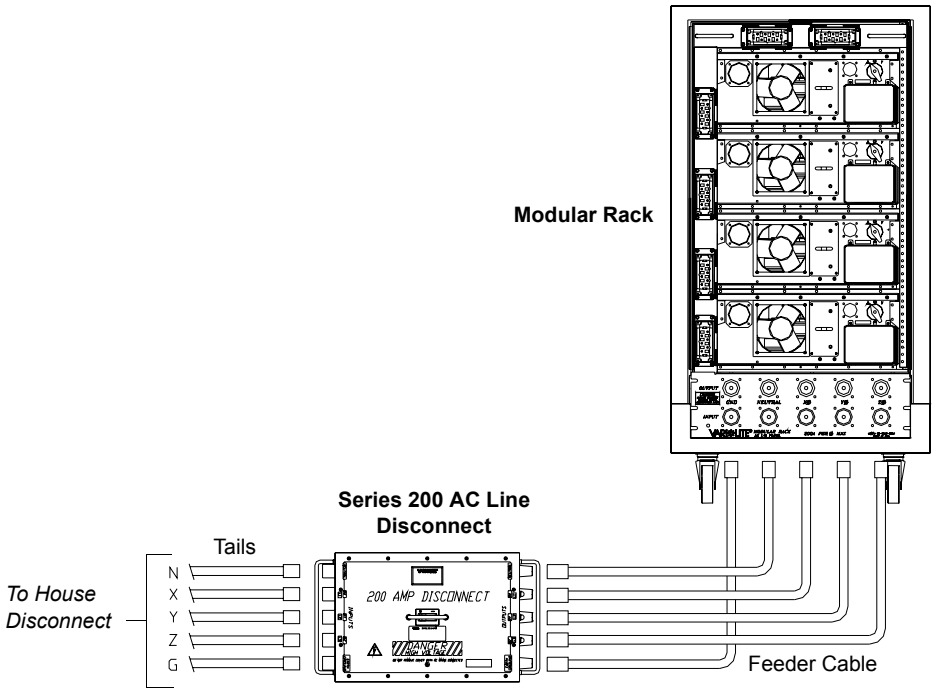
Refer to "Configuring Equipment For Delta or Wye Operation" on page 20.

Step 2. Connect Modular Rack to power source.

Three-phase power will need to be supplied to the system. The maximum recommended mod rack power requirement is 200 amps, using 2/0 feeder with 4/0 Cam-Lok connectors and a 200A line disconnect. A SixPack Chassis requires 30 amps, and uses Hubbell or Epic connectors on 8/5 multicore cable. Connector choice is dependent upon location. This cable will need to be run from a house disconnect through a 30A line disconnect to the racks.

WARNING: The high voltages required to run this equipment are dangerous. Electrical "tie-ins" should be handled by a qualified electrician.

Note: Some equipment in Europe will work using single-phase power. Check with an Account Manager regarding your event.



Step 3. Configure APS6 modules. (There are two types of APS6 modules.)

a. For older APS6 modules, a blue programming jumper is used to configure the module in either PSET or DCV mode and a jumper resistor assembly is used to configure the module in either the 400W or 625W power output mode.

Note: Older style APS6 modules cannot be used with the VL6C/VL6C+, VL7, VL7U, VL7B, or VL7UB luminaires, which require the 700W power output mode found on the new style modules.

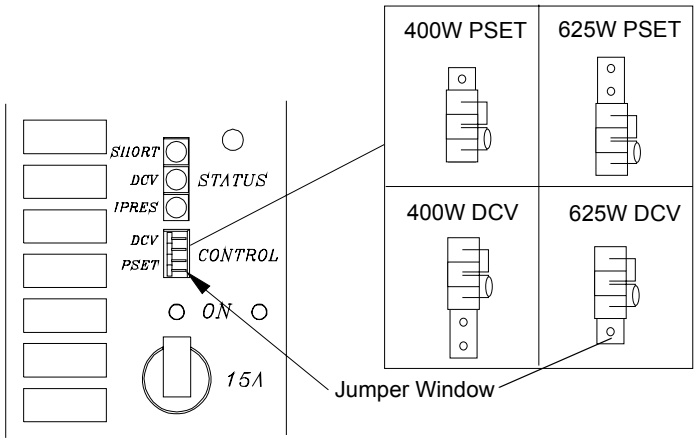
Jumper settings:

400W PSET operation (normal fixed level wattage)

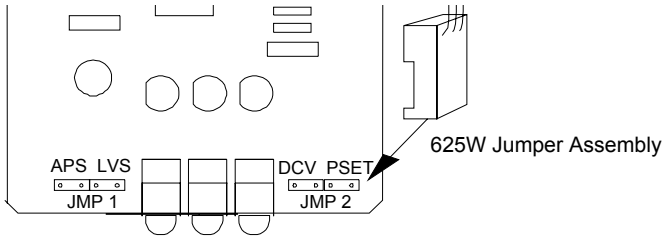
625W PSET operation (normal fixed level wattage)

400W DCV operation (0-10Vdc input required from SPC-36 controller)

625W DCV operation (0-10Vdc input required from SPC-36 controller)



1) At APS6 PCB header marked JMP2, carefully remove jumper from current setting.



Note: It is normal for jumper to hang one pin off the header in 400W DCV and 625W PSET modes.

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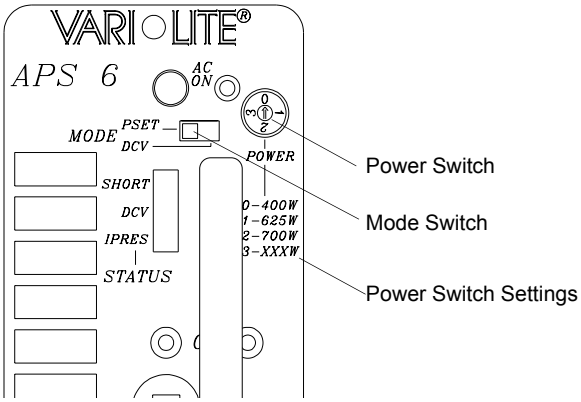
2) Install jumper across required header pins.

b. For newer APS6 modules, a four position rotating switch on the face plate sets the output to 400, 625, or 700 watts (the fourth setting is also currently 400W).

1) Set mode switch to either PSET or DCV.

CAUTION: Do not change mode or wattage with power applied to module.

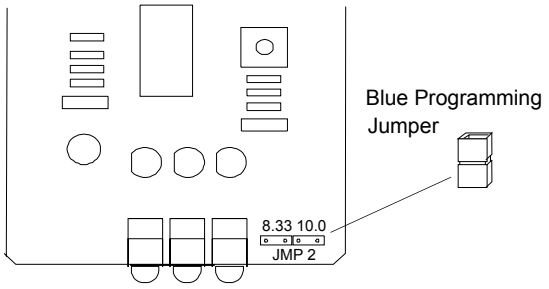
2) Using 3/32 slot screwdriver (07.3005.0001), rotate power selector switch to required output according to settings listed on face plate.



Step 4. Configure C3 modules.

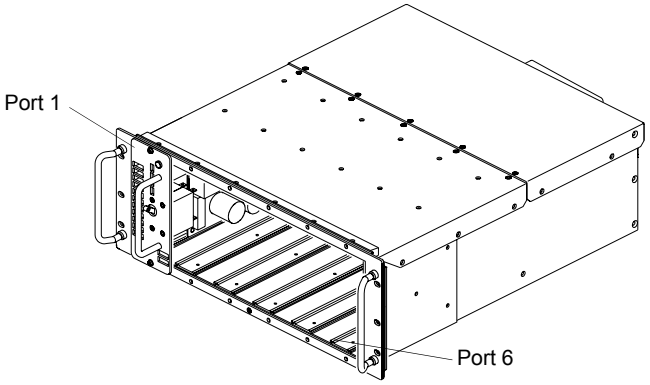
The C3 module can be configured in two different output modes to accommodate both the 1000 watt and 1200 watt versions of the 120V incandescent lamps use with the VL5 and VL5B luminaires. The 8.33 mode is used with 1000W/120V lamps and the 10.0A mode is used with 1200W/120V lamps. A 0W shunt (blue programming jumper) installed at PCB determines the mode.

a. At PCB, install 0W shunt (blue programming jumper) on header marked 8.33A for 1000W operation or 10.0A for 1200W operation.



Step 5. Configure Modular Rack.

Configure APS6 and/or C3 modules in SixPack chassis with regard to port assignments for each Smart Repeater unit. In other words, if there is a VL6 luminaire connected to the first output on a Smart Repeater unit, an APS6 module should be installed in the first slot of the chassis connected to that Smart Repeater unit so that it receives power from an arc power supply module.



Step 6. Configure SPC-36 controller.

If an SPC-36 controller is used to remotely start VL6 luminaire lamps or control C3 modules, it is normally installed into the topmost position of the modular rack. However, it can be removed from the modular rack and installed elsewhere as long as it is still directly connected to a SixPack chassis.

CAUTION: It is preferable to connect the SPC-36 controller's S200 AC & DATA input to a SERIES 200 POWER OUT connector on modular rack's breaker panel and not to a separate power source. This prevents ground-loop problems when modular rack and SPC-36 controllers are on separate power sources. DO NOT share separate grounds.

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a. For APS6 modules, make sure that the PSET or DCV jumper is set to DCV mode for correct wattage so that it can correctly respond to the SPC-36 controller. Refer to "Configure APS6 modules. (There are two types of APS6 modules.)" on page 85.

b. Attach the SPC-36 controller cables to each of the control inputs on the SixPack chassis installed in the modular rack.

c. Set SPC-36 controller thumbwheel address. One SPC-36 controller can control up to 36 modules.

Step 7. Hang luminaires.

a. Determine hanging orientation of luminaires (refer to "Luminaire Orientation and Placement" on page 57). Ensure the following:

1) Pipe for mounting luminaires is between 1 and 2 inches (25.40 to 50.80 mm) in outer diameter.

2) The structure is secure and capable of supporting total luminaire load.

3) Sufficient clearance space is provided for each luminaire.

Note: It is recommended that all luminaire input connectors be orientated facing stage left, or at least in the same direction by hanging position.

b. Make sure that double truss hook or clamp (VL7) is oriented and bolted to pan tube correctly.

Luminaire addresses are usually decided upon prior to the set-up of equipment. The lighting plot may contain this information.

c. Loop safety cable around pipe two or three times leaving as little slack as possible and attach clip to opposite side of pan tube or chassis. Ensure that safety cable will not interfere with luminaire movement.

Step 8. Hang and configure Smart Repeater units.

Note: When hanging a repeater, hang so that the red and green comm LED indicators will be visible to the tech, not the audience, when the truss is raised (at trim).

a. Attach Smart Repeater units to pipe or truss using two Series 200 truss hooks (turn quarter-turn fastener clockwise). Refer to "Series 200 Hanging Hardware" on page 60 for more information. Do not over-turn quarter-turn fastener or truss hook receptacle assembly may be damaged.

b. Attach safety cable to handle and verify that unit is securely fastened to pipe or truss.

c. Set thumbwheel to correct system address.

Note: The Smart Repeater also requires a DMX mode, which is set at the thumbwheel. For more information on setting DMX modes, see "DMX512 Modes" on page 10.

Step 9. Connect APS trunk cables and Socapex cables.

Note: When using only VL5 and/or VL5B luminaires, industry-standard Socapex cables can be used in place of APS trunk cables.

a. Connect plug end of APS trunk cables to SixPack chassis in modular rack outputs.

b. Connect receptacle end to Smart Repeater units.

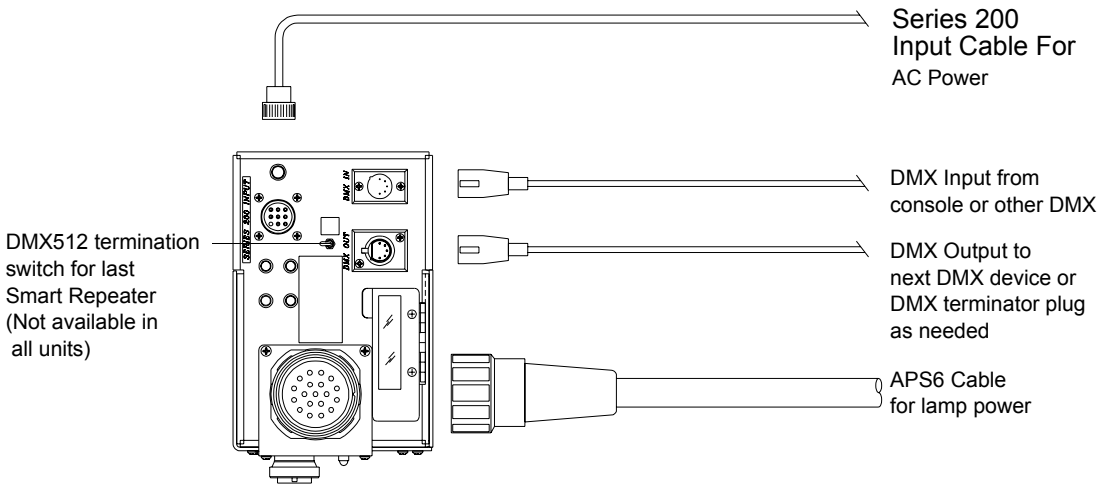
Step 10. Connect cables.

a. Connect plug end of Series 300 lamp cable to Smart Repeater unit.

b. Connect receptacle end of lamp cable to Series 300 luminaire. Make sure to use correct length of lamp cable to avoid having too much excess. Avoid using many short lamp cables connected together since the more interconnections that exist, the more noise and maintenance problems that may develop. Dress cable to truss using either tie string or PVC tape. Ensure that cable does not impair operation of luminaires.

Note: To avoid noise problems, make sure to not use the older, unshielded, gray-jacketed Series 300 lamp cable with VL5Arc and VL6 luminaires.

c. Connect DMX512 cable from console or splitter. Remember to terminate the last device in any DMX512 line.



d. Connect AC cable (a Series 200 connector to male power plug), which will come from a non-dim circuit or other non-voltage-controlled source.

Step 11. Connect Signals to Racks

a. Set up console and run the control snake.

b. Plug DMX512 cables (one per universe) into the console and run them to the first DMX512 unit in line; this first device can be a DMX512 splitter, which takes one DMX512 universe in and outputs it multiple times. Or, the DMX512 cable can run directly to the dimmers and can continue on to other devices from there.

Step 12. Perform final inspection.

Ensure that all components are securely connected and that safety cables have been installed. Ensure that cabling is routed safely.

Step 13. Perform system checkout and troubleshooting.

Refer to "Series 300 Checkout" on page 91.

System Checkout

Series 200 Checkout

Once the system has been hung, cabled and connected to the console via the control snake:

Step 1. Apply power to DMX200 unit. Verify that on switch lights.

Step 2. Verify that console is powered up and patched.

Step 3. Verify that red and green LEDs on DMX200 unit are blinking on and off. If they are not, at XLR input connector, verify that cable is correctly installed and fully seated.

Step 4. Verify seven segment display on DMX200 unit matches DMX512 connections:
Display readout "1" = connection to DMX IN #1
Display readout "2" = connection to DMX IN #2
Display readout "3" = connection to DMX IN #1 & 2
Display readout "n" = no DMX IN connection

Step 5. Apply power to lights at ACS rack.

Step 6. Watch luminaires calibrate. Be aware that luminaires will only calibrate if a valid if operating system is received from the DMX200 unit.

Step 7. Tilt all luminaires parallel to the floor and start all lamps if not already struck.

Step 8. For luminaires that do not light, try to start lamp again. If luminaire still does not light, problem may be in lamp or connections to lamp. Refer to appropriate luminaire user's manual for troubleshooting procedures.

Step 9. Perform visual check of the system. Note any lamps that have not started or appear dim or discolored.

   a. If lamp appears unusually dim after three minutes, douse lamp, wait five minutes, and recheck lamp mounting. Ensure that lamp is securely seated in its socket and oriented properly. Unusually dim luminaires may need to have lamp replaced. Refer to appropriate luminaire user's manual for lamp replacement procedure.

   b. If any lamps still do not start, replace it. If new lamp does not start, problem may be power supply.

Step 10. Perform diagnostic cues for each luminaire.

Series 300 Checkout

Once the system has been hung, cabled and connected to the console via the control snake:

Step 1. Turn on console and ensure that DMX512 signal is applied to the entire system. Patch your console, or load your show from disk.

Step 2. Apply power to the Smart Repeater units in the system, and watch the luminaires calibrate. Be aware that the luminaires will only calibrate if a valid DMX512 signal is received. Check the red LEDs on the output port side of the Smart Repeater unit to verify that signal is present.

Step 3. Ensure that the operating mode for each Smart Repeater unit has been properly set. Refer to "DMX512 Modes" on page 10.

Step 4. Once all the luminaires have completed their calibration procedure, select each luminaire individually and pan and tilt to ensure control.

Step 5. Point arc luminaires horizontally and strike the lamps by turning on the switch on the APS6 module, or through the start/douse channel patched to the SPC36 SixPack Controller (set level to full).

Step 6. Give arc luminaires an intensity to verify that they are lit. For VL5 and VL5B wash luminaires, ensure that the lamp intensity control channel matches the selected luminaire as you pan and tilt them.

Step 7. Continue checking all other attributes to verify proper operation.

Step 8. If there are no problems, you are now ready to begin programming.

Notes

4.

Testing and Troubleshooting

This chapter contains troubleshooting instructions.

- **Troubleshooting**
- **Test Software**

Troubleshooting

Overview

Occasionally there are problems when setting up a lighting system. In this section, you will find many common questions asked about VARI✱LITE® Series 200/300 equipment under DMX512 control. This section is broken down into three areas: Console Problems, Fixture Problems, and Hardware Problems. Determine where your problem exists (careful -- some problems that appear to be fixture related end up being patch related), and read the appropriate section for an answer to your question. Remember -- there are many questions, and we cannot answer all of them here, but hopefully we can point you toward a solution.

Console Problems

Console won't power up.

Ensure that the console is plugged into a working outlet and that the proper voltage is present.

One of the Monitors isn't working.

Ensure that the monitors are plugged into a working outlet, they are securely plugged into the monitor outlet on the console and that the console has been properly setup for the number of monitors being used.

My monitor display is scrolling and I can't understand it.

Ensure that the proper type of monitor (VGA, SVGA, EVGA) is connected to your console.

I've programmed my show using an Extended Mode, and during the editing process, it's really annoying having to wait for the cue to complete before I can work on the cue.

To "disable" the timing values while updating cues, create a submaster of all the timing channels and run it to full to override any recorded timing channels. Remember to clear the sub before recording the updated cue.

My patch is good, and my Smart Repeater units are addressed properly, but I can't control any lights.

Check the DMX512 connection on the back of the console to make sure it is connected to the proper DMX512 output (or universe). If you are using a splitter in a system with multiple DMX512 universes, make sure it has power is receiving signal from the proper DMX512 universe. Check Smart Repeater units for the seven-segment display showing the DMX512 mode setting and the "d" alternating. An "N" is displayed if the DMX512 data has been lost.

Series 300 Fixture Problems

Why do luminaires not move as smoothly on DMX512 as they do on a VARI✳LITE console?

A DMX512 control system sends out movement as incremental absolute positions. In other words, when you want a luminaire to go from 0% position (0 hex value) to an end state of 50% (127 hex value), the luminaire is told to move incrementally through each hex or per cent value until it reaches the end state. The luminaire is constantly stopping and starting. This is alleviated by using modes with extended timing channels.

Under VARI✳LITE control, the luminaire knows its current position and its ending position. Once the luminaire receives a cue command from the console, it calculates how far it needs to move, how much time it has to get there, and goes without starting and stopping between its beginning and end state.

I cannot get full movement from my fixtures.

Make sure that there are no cables hanging down to cause interference with the luminaires.

Why do some of my lights take the wrong path to a focus position (swinging out into the audience, etc.)?

First check that the luminaire is hung with the proper orientation. The pigtails should all face the same direction on the same hanging position.

If the luminaire is hung properly, you may have a "flipped focus." In order to avoid a "flipped focus" (when one or more fixtures move differently from others in the system), begin all preset focuses (a group of channels representing the pan and tilt values for a particular stage position) from zero position or "50/50" (pan and tilt values at 50%). This "50/50" can be stored as a group, and can be recalled before recording any other fixture's focus information.

Also remember that the luminaires will take the shortest path from one position to the next; in DMX512, this is the path described by the change in value per channel from one position to the next. In order to ensure consistent movement from luminaire to luminaire in the cueing structure, tilt each fixture first before moving the pan channel. In most cases, it is best when luminaires pan less than 180° from one focus position to another, allowing for smoother and more consistent transitions between cues.

Why do my VL6 color wheels get stuck during playback?

Allow a cue to complete before advancing to the next cue. Rushing or "stepping on" cues sends a confusing update of DMX512 information to the luminaire.

I can control the VL5 luminaire but not the dimmer.

Ensure that the remote dimmer is patched to the proper control channel for the luminaire. If there is an SPC-36 controlling C3 dimmers, check its power, thumbwheel address and all cables between it and each SixPack chassis. Also, ensure that the SPC-36 controller and dimmer are seeing a proper DMX512 signal.

My lights are flickering or moving erratically.

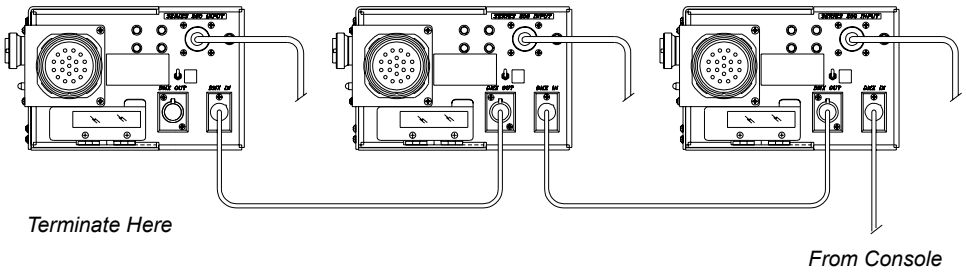
Make sure that the DMX512 lines from the console are not bundled with or run next to your feeder or other high voltage cable. If the DMX512 line must cross power cable, make sure it crosses at a 90° angle to the power cable for the best performance.

I checked my cable, but I still get flickering lights.

Check each DMX512 device for termination. Only the last device on any DMX512 line must be terminated. Over termination in your system can cause bad signal to reach the lights and dimmers causing them to flicker.

I checked for termination, but my lights still flicker.

Check your DMX512 network. DMX512 signal is best run as a "daisy chain" from one device to another. If your system is sufficiently large, or your luminaires are spread out over a considerable distance, you may be using an splitter (or opto-isolator) to safely create a "star pattern" of isolated DMX512 runs. Again, be sure to terminate the last device on any DMX512 run. A splitter can eliminate ground loop problems that may cause flickering.



My network is good, but I still have problems.

Try replacing each DMX512 cable one at a time to see if there is a bad cable in your system.

My network is good, but my lights still flicker.

Use a DMX512 tool (DMX512'ster, GAM Check or equivalent) to monitor the output of your console. If the data coming from the console is bad, the entire system may flicker.

I'm using timing channels in Extended Mode and my lights are moving in a jerky and erratic manner.

Ensure that you are not sending both timing channel values and console cue time to the Smart Repeater units. The software in the Smart Repeater unit can resolve one set timing information or the other, but not both simultaneously. Check the console manual to find the proper syntax to create a part cue with a time of zero.

Now that I've programmed my whole show using timing channels in Extended Mode, I can't "back into" or "skip" a cue for editing without waiting for the timing to complete.

Create a submaster or group of all timing channels for all luminaires at a level of 100%. Enable this submaster or group before sending the "go back" or "go to cue" command. Don't forget to clear the submaster or group before updating the cue. Remember a value of 100% in a timing channel causes that channel to react to cue timing.

Hardware Problems

None of the lights on one of my Smart Repeater units is working.

Ensure that the proper voltage is applied to the Smart Repeater unit. Ensure that the amber neon indicator next to the Series 200 male plug is on.

The first few channels of the light plugged into port 1 work, but they soon control the wrong attributes, and none of the other lights work properly.

Look at the end of the Smart Repeater unit next to the thumbwheel switch and check the number showing in the seven segment display. Ensure that the proper mode is selected, and the system should operate properly again.

I have control of my VL6 spot luminaire, but I can't get its lamp to strike.

Check the SixPack chassis and ensure that there is an APS6 module in place. Assure its switch is turned on in the proper rack port. Ensure that you have the proper module type: an APS6 module as opposed to a C3 module. Also check that the proper APS6 cable is plugged into the SixPack chassis.

I have not changed my patch or my Smart Repeater unit's addressing, but when I power up the system, some of my lights aren't responding the same way as in the past.

Check the mode of the Smart Repeater unit(s) in question. By looking at the seven-segment display to see what number is lit. If this number is not what you were expecting, reset the mode. See "Smart Repeater Units" on page 32 for instructions. There is a battery in the Smart Repeater unit that will cause this device to default to Mode 4 if it fails . If this is the case, reset the Smart Repeater unit to the proper mode, and the patch will be correct. Then, contact an Account Manager to arrange for a replacement.

The Seven Segment Display in my Smart Repeater unit does not have a number, but a letter.

The number shown in the Seven Segment Display will always denote which operating mode the Smart Repeater Unit. However, it can also be used to troubleshoot your system. Other codes that will show up and what they indicate:

d - DMX512 signal applied, alternates with the mode setting.
n - No DMX512 signal appears only after the DMX512 O/S download.

Apply DMX512 "signal, or turn on console.

E - Error: Invalid start address.

Re-address Smart Repeater Unit. Valid addresses are 001 - 506.

C - Code: Invalid DMX512 start code.

Check the integrity of your DMX512 cable -- a very rare occurrence.

Note: Shows currently programmed using DMX 4.0 Software can use Mode 5 or 6 without reprogramming. The RJ-45 jumper is no longer required in DMX 5.1.

Test Software

Operating Test Software

Note: In default mode, only Port 1 is selected for test operations. Only luminaire connected to Port 1 will respond to test commands.

To use Smart Repeater testing function:

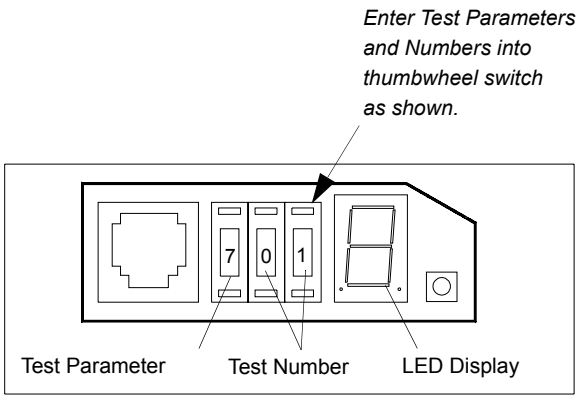
Step 1. Set Smart Repeater thumbwheel switch to 000 and connect luminaire to be tested to Port 1. (Up to six luminaires may be connected, but at least one must be connected to start test mode.)

Step 2. Apply power to Smart Repeater unit.

Step 3. Check LED display. Display should read [Sr uP], meaning "Smart Repeater Up."

Step 4. Check LED display. Display should read [P1 F=n], which means "Port 1 Form and Function Value=n," which indicates luminaire is online at Port 1. n=7 for VL5 luminaire, n=8 for VLM moving mirror unit, and n=9 for VL6 luminaire. Luminaire goes through normal calibration, except for position it is in when it stops.

Step 5. After calibration, press buttons above and below thumbwheel switch to enter desired test codes for testing particular luminaire functions. To select other ports for testing, set the thumbwheel switch to 051 and use the test parameter place on the thumbwheels switch (the hundreds digit) to select the desired ports: 0 for all ports, 1 through 6 for ports 1 through 6 respectively.



Test Software/Test Tables

The following tables contain test software test numbers, parameters, error codes, and comments. Use these tables to run luminaire tests.

Note: Test numbers not listed are not valid.

CAUTION: Tests should not be run for more than 30 seconds, as this can further damage the luminaire. Any tests run at FULL SPEED should not be run for more than 15 seconds.

Table 4-1: VL5 Family Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
000	Start Test	9	End Stop (Open)		
001	Pan Test	8	End Stop (Clsd)	103	No Reset (Pan)
002	Tilt Test	7	Speed 1 (25%)	203	No Reset (Tilt)
004	Diffuser Test	6	Speed 2 (35%)	104	No Change (Pan)
005	Intensity Test (VL5Arc Only)	5	Speed 3 (45%)	204	No Change (Tilt)
		4	Speed 4 (55%)		
006	Blue Filter Test	3	Speed 5 (65%)		
007	Amber Filter Test	2	Speed 6 (75%)		
008	Magenta Filter Test	1	Speed 7 (85%)		
		0	Speed 8 (Full Speed)		
012	All Motors (synchronized)				
013	All Motors (unsynchronized)				
912	End Motor (in calibration position)				

Table 4-2: VL5 Family Default Programs

Test Number		Test	Functions
31	Pan and Tilt	701	Pan 25% Speed
		702	Tilt 25% Speed
37	VL5 Functions	704	Edge 25% Speed
		706	Blue Filter Test 25% Speed
		707	Amber Filter Test 25% Speed
		708	Magenta Filter Test 25% Speed

Table 4-3: VL6 Spot Luminaire Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
000	Start Test	9	End Stop (Open)	103	No Reset (Pan)
001	Pan Test	8	End Stop (Clsd)	203	No Reset (Tilt)
002	Tilt Test	7	Speed 1 (25%)	104	No Reset (Pan)
004	Edge Test	6	Speed 2 (35%)	204	No Reset (Tilt)
		5	Speed 3 (45%)		
		4	Speed 4 (55%)		
		3	Speed 5 (65%)		
		2	Speed 6 (75%)		
		1	Speed 7 (85%)		
		0	Speed 8 (Full Speed)		
005	Intensity Test	9	End Stop (Open)	511	Hit Sensor When Not Expecting To.
		8	End Stop (Clsd)	514	Did Not Hit Sensor When Expecting To.
		7	Speed 1 (25%)		
		6	Speed 2 (35%)		
		5	Speed 3 (45%)		
		4	Speed 4 (55%)		
		3	Speed 5 (65%)		
		2	Speed 6 (75%)		
		1	Speed 7 (85%)		
		0	Speed 8 (Full Speed)		
006	Wheel 1 Test	9	CW 1 Frame to Sensor	611	Hit Sensor When Not Expecting To (WH1)
007	Wheel 2 Test	8	CCW 1 Frame to Sensor (Oscillating)	614	Did Not Hit Sensor When Expecting To (WH2)
		7	CW 1 Frams to Sensor (Oscillating)	711	Hit Sensor When Not Expecting To (WH2).
		6	CCW 1 Frame to Sensor (Oscillating)	714	Did Not Hit Sensor When Expecting To (WH2).
		5	Continuous Frame Step		Direction Opposite Of Spin.
		4	Speed 1 spin		
		3	Speed 2 spin		Spin Speeds Match Those
		2	Speed 3 spin		Achievable From Console.
		1	Speed 4 spin		

Table 4-3: VL6 Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		0	Speed 5 Spin (Full Speed)		Spin Speeds match those available from console
012	All Motors (synchronized)				
013	All Motors (unsynchronized)				
912	End Motor (in cal. position)				

Table 4-4: VL6 Spot Luminaire Default Programs

Test Number		Test	Functions
31	Pan and Tilt	701	Pan 25% Speed
		702	Tilt 25% Speed
39	VL6 Functions	703	Beam 25% Speed
		705	Edge 25% Speed
		706	Wheel 1 Continuous Frame
		707	Wheel 2 Continuous Frame

Table 4-5: VL6B/VL6C/VL6C+ Spot Luminaire Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
000	Start Test	9	End Stop (OPEN)	103	No Reset (PAN)
001	Pan Test	8	End Stop (CLOSED)	203	No Reset (TILT)
002	Tilt Test	7	Speed 1	104	No Reset (PAN)
003	Beam Test	6	Speed 2	204	No Reset (TILT)
		5	Speed 3 (45%)		
		4	Speed 4 (55%)		
		3	Speed 5 (65%)		
		2	Speed 6 (75%)		
		1	Speed 7 (85%)		
		0	Speed 8 (FULL SPEED)		
004	Lens Test	7	All move to front EOT, Lens 1 cycles full travel (100%)		
		6	Lens 1 move to rear EOT, Lens 3 move to from EOT, Lens 2 cycles full travel (33%)		

Table 4-5: VL6B/VL6C/VL6C+ Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		5	Lens 1 move to rear EOT, Lens 3 move to front EOT, Lens 2 cycles full travel (66%)		
		4	Lens 1 move to rear EOT, Lens 3 move to front EOT, Lens 2 cycles full travel (100%)		
		3	All lenses move to rear EOT, Lens 3 cycles full travel (33%)		
		2	All lenses move to rear EOT, Lens 3 cycles full travel (66%)		
		0	All synchronous (100%)		
005	Intensity Test	9	End Stop (OPEN)	511	Hit Sensor When Not Expecting To
		8	End Stop (CLOSED)	514	Did Not Hit Sensor When Expecting To
		7	Speed 1		
		6	Speed 2		
		5	Speed 3		
		4	Speed 4		
		3	Speed 5		
		2	Speed 6		
		1	Speed 7		
		0	Speed 8 (FULL SPEED)		
006	Wheel 1 Test	9	CW 1 Frame To Sensor	611	Hit Sensor When Not Expecting To
007	Wheel 2 Test	8	CCW 1 Frame To Sensor	614	Did Not Hit Sensor When Expecting To
		7	CW 1 Frame To Sensor (Osculating)	711	Hit Sensor When Not Expecting To
		6	CCW 1 Frame To Sensor (Osculating)	714	Did Not Hit Sensor When Expecting To
		5	Continuous Frame Step		Direction Opposite of Spin
		4	Speed 1 Spin		
		3	Speed 2 Spin		
		2	Speed 3 Spin		
		1	Speed 4 Spin		
		0	Speed 5 Spin (Full Speed)		Spin Speeds match those available from Console
009	Rotating Gobos	9	Wheel position is open (no gobo)		

Table 4-5: VL6B/VL6C/VL6C+ Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		8	Gobo position 6		
		7	Cycle from wheel position 0 to position 3 CW, from position 3 to position 0 CCW repeatedly. Pause briefly on position 0 and 3		
		6	Cycle from wheel position 0 to position 2 CCW, from position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2		
		5	Continuous change CW to next gobo position on wheel (from 2 to 3,5 to 0) Gobos on wheels do not rotate. Pause briefly on each gobo		
		4	Cycle from wheel position 0 to position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2(25%)		
		3	Cycle from wheel position 0 to position 2 CCW, from position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2 (45%)		
		2	Cycle from wheel position 0 to position 2 CCW, from position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2 (45%)		
		1	Cycle from wheel position 0 to position 2 CCW, from position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2 (85%)		
		0	Cycle from wheel position 0 to position 2 CCW, from position 2 to position 0 CW repeatedly. Pause briefly on position 0 and 2 (100%)		
010	Index	9	Cycle from index 0 to index 30 CW, from index 30 to index 0 CCW repeatedly. Pause briefly on index 0 and 30 (85%)		
		8	Cycle from index 0 to index 5 CCW, from index 5 to index 0 CW repeatedly. Pause briefly on index 0 and 5		

Table 4-5: VL6B/VL6C/VL6C+ Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		7	Cycle from index 0 to index 3 CW, from index 3 to index 0 CCW repeatedly. Pause briefly on index 0 and 3		
		6	Cycle from index 0 to index 6 CW, from index 6 to index 0 CCW repeatedly. Pause briefly on index 0 and 6		
		5	Continuous Stop/Start through 14 different index positions		
		4	Continuous Rotation Speed 25%		
		3	Continuous Rotation Speed 45%		
		2	Continuous Rotation Speed 65%		
		1	Continuous Rotation Speed 85%		
		0	Continuous Rotation Speed 100%		
012	All Motors (synchronized)				
013	All Motors (synchronized)				
912	End Motor (in cal. position)				

Table 4-6: VL6B/VL6C/VL6C+ Spot Luminaire Default Test Programs

Test Number		Test	Functions
31	Pan and Tilt	701	Pan 25% Speed
		702	Tilt 25% Speed
39	VL6B/VL6C/VL6C+ Functions	703	Beam 25% Speed
		705	Edge 25% Speed
		706	Wheel 1 Continuous Frame
		707	Wheel 2 Continuous Frame
		709	Rotating Gobos

Table 4-7: VL7/VL7U Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
000	All Stop				
001	Pan	9	End Stop (Closed), 65% Speed	103	No Reset (PAN)
002	Tilt	8	End Stop (Open), 65% Speed	203	No Reset (TILT)
003	Beam	7	25% Speed	104	No Reset (PAN)
		6	35% Speed	204	No Reset (TILT)
		5	45% Speed		
		4	55% Speed		
		3	65% Speed		
		2	75% Speed		
		1	85% Speed		
		0	Full Speed		
004	Lens	7	All move to front EOT, Lens 1 cycles full travel at 100% speed (Test Type 4D)		
		6	Type 4C, 33% speed		
		5	Type 4C, 66% speed		
		4	Lens 1 move to rear EOT, Lens 3 moves to front EOT, Lens 2 cycles full travel at 100% speed (Test Type 4C)		
		3	Type 4B, 33% speed		
		2	Type 4B, 66% speed		
		1	All lenses move to rear EOT, Lens 3 cycles full travel at 100% speed (Test Type 4B)		
		0	All synchronous at 100% speed (Test Type 4A)		
005	Intensity	9	End Stop (Closed), 65% Speed		
		8	End Stop (Open), 65% Speed		
		7	25% Speed		
		6	35% Speed		
		5	45% Speed		
		4	55% Speed		
		3	65% Speed		
		2	75% Speed		
		1	85% Speed		
		0	Full Speed		
006	Color Plate 1	9	Plate moves to open X &Y at 100% speed (Test Type 67D)		
007	Color Plate 2	8	Type 67C, 25% speed		
		7	Type 67C, 50% speed		
		6	Type 67C, 75% speed		

Table 4-7: VL7/VL7U Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		5	Plate cycles full travel at 100% speed along Y vector (Test Type 67C)		
		4	Type 67B, 25% speed		
		3	Type 67B, 50% speed		
		2	Type 67B, 75% speed		
		1	Plate cycles full travel at 100% speed along X vector (Test Type 67B)		
		0	Plate moves from X & Y EOT to opposite X & Y EOT syncronous, repeatedly at 100% speed (Test Type 67A)		
008	Fixed Gobo	9	Cycle from index 0 to index 1 CW, and from index 1 to index 0 CCW repeatedly. Pause briefly on index 0 and 1. (Test Type 8F)		
		8	Cycle from index 0 to index 11 CCW, and from index 11 to index 0 CW repeatedly. Pause briefly on index 0 and 11. (Test Type 8E)		
		7	Cycle from index 0 to index 6 CW, and from index 6 to index 0 CCW repeatedly. Pause briefly on index 0 and 6. (Test Type 8D)		
		6	Cycle from index 0 to index 6 CCW, and from index 6 to index 0 CW repeatedly. Pause briefly on index 0 and 6. (Test Type 8C)		
		5	Continuously index CW to next gobo position on wheel (from 2 to 3, from 11 to 0). Pause briefly on each gobo. (Test Type 8B)		
		4	Type 8A, 20% speed		
		3	Type 8A, 40% speed		
		2	Type 8A, 60% speed		
		1	Type 8A, 80% speed		
		0	Wheel spins CW at 100% speed (Test Type 8A)		
009	Rotating Gobo	9	Cycle from index 0 to index 1 CW, and from index 1 to index 0 CCW repeatedly. Pause briefly on index 0 and 1. (Test Type 9G)		
		8	Cycle from index 0 to index 5 CCW, and from index 5 to index 0 CW repeatedly. Pause briefly on index 0 and 5. (Test Type 9F)		

Table 4-7: VL7/VL7U Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		7	Cycle from index 0 to index 3 CW, and from index 3 to index 0 CCW repeatedly. Pause briefly on index 0 and 3. (Test Type 9E)		
		6	Cycle from index 0 to index 6 CCW, and from index 6 to index 0 CW repeatedly. Pause briefly on index 0 and 6. (Test Type 8C)		
		5	Continuously index CW to next gobo position on wheel (from 2 to 3, form 5 to 0). Gobos on wheel do not rotate. Pause briefly on each gobo. (Test Type 9C)		
		4	Cycle gobos between orientation 0 degrees & 180 degrees repeatedly. Wheel does not move. Pause briefly at 0 and 180 degrees. (Test Type 9B)		
		3	Type 9A CCW, 100% speed		
		2	Type 9A CCW, 50% speed		
		1	Type 9A CCW, 25% speed		
		0	Spin gobos CW at 100% speed, wheel does not move. (Test Type 9A)		
010	Strobe	9	65% speed strobe to EOT stop, (closed)		
		8	65% speed strobe to middle position between EOT stops. (open)		
		7	25% strobe from open stop to closed stop repeatedly (i.e. cycling)		
		6	35% strobe cycling		
		5	45% strobe cycling		
		4	55% strobe cycling		
		3	65% strobe cycling		
		2	75% strobe cycling		
		1	85% strobe cycling		
		0	Full speed (100%) strobe cycling		
013	All Async		All tests above will run asynchronously. All motors will reach respective EOT stops (if applicable) and begin motion to opposite EOT stops at each motor's earliest opportunity. Motion will not be coordinated between motors.		
021	Sensors	9	Monitor Lens 3 Sensor		
		8	Monitor Lens 2 Sensor		
		7	Monitor Lens 1 Sensor		
		6	Monitor Strobe Sensor		
		5	Monitor Fixed Gobo Sensor		

Table 4-7: VL7/VL7U Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		4	Monitor Rotating Gobo Wheel Index Sensor and Gobo Orientation Sensor		
		3	Monitor Color Plate 2Y sensor		
		2	Monitor Color Plate 2X sensor		
		1	Monitor Color Plate 1Y sensor		
		0	Monitor Color Plate 1X sensor		
022/ 023	Pan/Tilt	9	Display current most significant digit (Xxxx) of the reported encoder value. Repeatedly monitored.		
		8	Display current second significant digit (xXxx) of the reported encoder value. Repeatedly monitored.		
		7	Display current third significant digit (xxXx) of the reported encoder value. Repeatedly monitored.		
		6	Display current least significant digit (xxxX) of the reported encoder value. Repeatedly monitored.		
		0	Display scrolling snapshot of each digit of the reported encoder value. Repeatedly monitored.		
024	Form & Function	0	Display the form and function value of the luminaire. For the VL7, Py=F10 should be reported where y is the luminaire's port number.		

Table 4-8: VL7/VL7U Default Test Programs

Test Number		Test	Functions
31	Pan and Tilt	701	Pan 25% Speed
		702	Tilt 25% Speed
39	VL7 Functions	703	Beam 25% Speed
		705	Edge 25% Speed
		709	Rotating Gobo
		506	Wheel 1 Continuous Frame
		507	Wheel 2 Continuous Frame
003	Beam Test		
004	Lens Test		
005	Intensity Test		
006	Plate 1 Test		
007	Plate 2 Test		
008	Fixed Gobo Test		
009	Rotating Test		
010	Strobe Test		

Table 4-9: VL7B/VL7UB Spot Luminaire Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
000	All Stop			103	No Reset (PAN)
001	Pan Test	9	End Stop (65%) (CLSD)	203	No Reset (TILT)
002	Tilt Test	8	End Stop (65%) (OPEN)	104	No Reset (PAN)
003	Beam Test		N/A		
004	Lens Test	7	All move to front EOT, Lens 1 cycles full travel (100%)		
		6	Lens 1 move to rear EOT, Lens 3 move to front EOT, Lens 2 cycles full travel (33%)		
		5	Lens 1 move to rear EOT, Lens 3 move to front EOT, Lens 2 cycles full travel (66%)		
		4	Lens 1 move to rear EOT, Lens 3 move to front EOT, Lens 2 cycles full travel (33%)		
		3	All lenses move to rear EOT, Lens 3 cycles full travel (33%)		
		2	All lenses move to rear EOT, Lens 3 cycles full travel (66%)		
		1	All lenses move to rear EOT, Lens 3 cycles full travel (100%)		
		0	All synchronous (100%)		
005	Intensity Test	9	End Stop (66%) (CLSD)		
		8	End Stop (66%) (OPEN)		
		7	Speed 1 (25%)		
		6	Speed 2 (35%)		
		5	Speed 3 (45%)		
		4	Speed 4 (55)		
		3	Speed 5 (65%)		
		2	Speed 6 (75%)		
		1	Speed 7 (85%)		
		0	Speed 8 (Full Speed)		
006	Color Plate 1	9	Plate moves to open X & Y (100%) Test Type 67D		
007	Color Plate 2	8	Plate cycles full travel (25%) along Y vector		
		7	Plate cycles full travel (50%) along Y vector		

Table 4-9: VL7B/VL7UB Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		6	Plate cycles full travel (75%) along Y vector		
		5	Plate cycles full travel (100%) along Y vector		
		4	Plate cycles full travel (25%) along X vector		
		3	Plate cycles full travel (50%) along X vector		
		2	Plate cycles full travel (75%) along X vector		
		1	Plate cycles full travel (100%) along X vector		
		0	Plate moves from X & Y EOT to opposite X & Y EOT synchronous repeatedly (100%)		
008	Fixed Gobo		N/A		
009	Rotating Gobos	9	Cycle from wheel position 0 to position 1 CW, from position 1 to position 0 CCW repeatedly. Pause briefly on position 0 and 1		
		8	Cycle from wheel position 0 to position 5 CCW, from position 5 to position 0 CW repeatedly. Pause briefly on position 0 and 5		
		7	Cycle from wheel position 0 to position 3 CW, from position 3 to position 0 CCW repeatedly. Pause briefly on position 0 and 3		
		6	Cycle from wheel position 0 to position to position 6 CCW, from position 6 to position 0 CCW repeatedly. Pause briefly on position 0 and 6		
		5	Continuous wheel position CW to next gobo position on wheel (from 2 to 3, 5 to 0) Gobos on wheels do not rotate. Pause briefly on each gobo		
		4	Cycle gobos between orientation 0° & 180°		
		3	Spin gobos CW (100%) wheel does not move		
		2	Spin gobos CW (50%) wheel does not move		

Table 4-9: VL7B/VL7UB Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		1	Spin gobos CW (25%) wheel does not move		
		0	Spin gobos CW (100%) wheel does not move		
010	Strobe Test	9	Strobe to EOT stop (65%) (CLSD)		
		8	Strobe to middle position between EOT Stop (66%) (OPEN)		
		7	Strobe open to closed stop repeatedly (25%) (i.e. cycling)		
		6	Cycling (35%)		
		5	Cycling (45%)		
		4	Cycling (55%)		
		3	Cycling (65%)		
		2	Cycling (75%)		
		1	Cycling (85%)		
		0	Cycling (Full Speed)		
013	All Async		All tests above will run asynchronously. All motors will reach respective EOT stop (if applicable) and begin motion to opposite EOT stops at each motor's earliest opportunity. Motion will not be coordinated between motor.		Flashing display indicates sensor not hit. Solid display indicates sensor hit.
021	Sensors	9	Monitor Lens 3 Sensor		
		8	Monitor Lens 2 Sensor		
		7	Monitor Lens 1 Sensor		
		6	Monitor Strobe Sensor		
		5	Monitor Fixed Gobo Sensor		
		4	Monitor Rotating Gobo Wheel, Wheel position Sensor and Gobo Orientation Sensor		
		3	Monitor Plate 2 Saturation Sensor		
		2	Monitor Plate 2 Color Sensor		
		1	Monitor Plate 1 Saturation Sensor		
		0	Monitor Plate 1 Color Sensor		
022/ 023	Pan/Tilt Encoders	9	Display current most significant digit (Xxxx) of the reported encoder value. Repeatedly monitored.		

Table 4-9: VL7B/VL7UB Spot Luminaire Mechanical Tests (Continued)

Test Number		Test Parameter		Error Codes/Comments	
		8	Display current most significant digit (Xxxx) of the reported encoder value. Repeatedly monitored.		
		7	Display current most significant digit (Xxxx) of the reported encoder value. Repeatedly monitored.		
		6	Display current most significant digit (Xxxx) of the reported encoder value. Repeatedly monitored.		
		0	Display scrolling snapshot of each digit of the reported encoder. Repeatedly monitored.		
024	Form and Function	0	Display the form and function value of the luminaire. For the VL7 Py=F10 should be reported where Y is the luminaire's port number.		
071-079*	Shutter System Motor Test (Motors 1-9)	0	Full speed (100%) framing from open stop to closed stop repeatedly		Shutter Motor Tests
		1	motor cycling (85%)	071	Operates Motor 1
		2	motor cycling (75%)	072	Operates Motor 2
		3	motor cycling (65%)	073	Operates Motor 3
		4	motor cycling (55%)	074	Operates Motor 4
		5	motor cycling (45%)	075	Operates Motor 5
		6	motor cycling (35%)	076	Operates Motor 6
		7	motor cycling (25%)	077	Operates Motor 7
		8	End stop motor cycling (65%) (OPEN)	078	Operates Motor 8
		9	End stop motor cycling (65%) (CLSD)	079	Operates Motor 9

* Motors 1-8 actuate the framing blades and Motor 9 rotates the framing device.

Table 4-10: VL7B/VL7UB Spot Luminaire Default Test Programs

Test Number		Test	Functions
31	Pan and Tilt	701	Pan 25% Speed
		702	Tilt 25% Speed
39	VL7B Functions	703	Beam 25% Speed
		705	Edge 25% Speed
		709	Rotating Gobos
		506	Wheel 1 Continuous Frame
		507	Wheel 2 Continuous Frame
003	Beam Test	N/A	
004	Lens Test		
005	Intensity Test		
006	Plate 1 Test		
007	Plate 2 Test		
008	Fixed Gobo Test	N/A	
009	Rotating Test		
010	Strobe Test		

Table 4-11: VLM Mirror Mechanical Tests

Test Number		Test Parameter		Error Codes/Comments	
01	Pan	9	End Stop (Open)	103	No Reset (Pan)
02	Tilt	8	End Stop (Clsd)	203	No Reset (Tilt)
		7	Speed 1 (25%)	104	No Change (Pan)
		6	Speed 2 (35%)	204	No Change (Tilt)
		5	Speed 3 (45%)		
		4	Speed 4 (55%)		
		3	Speed 5 (65%)		
		2	Speed 6 (75%)		
03	Tilt spin	9	CW Spin (Slowest)	203	No Reset (Tilt)
		8	CW Spin (25%)	204	No Change (Tilt)
		7	CW Spin (50%)		
		6	CW Spin (75%)		
		5	CW Spin (Full Speed)		
		4	CCW Spin (Slowest)		
		3	CCW Spin (25%)		
		2	CCW Spin (50%)		
		1	CCW Spin (75%)		
		0	CCW Spin (Full Speed)		
12	All-Sync	1	Speed 7 (85%)		
13	All-Async	0	Speed 8 (Full Speed)		

Table 4-12: Electronics Tests

Test Number		Test Parameter		Test Result	
17	RAM	0	All	Pass=	Pn-Good
		1	Internal	Fail=	Pn-In-Ad- / Pn-In-PA-
		2	Local	Fail=	Pn-Lo-Ad- / Pn-Lo-PA-
		3	Expansion	Fail=	Pn-E-Ad- / Pn-EP-PA-
				Result	Ad=x-EP=x-Fo=x
18	Timer	0	All	Pass=	Pn Good
		1	Internal	Fail=	Pn Er *any non-zero digit*

Table 4-13: Manual Tests

Test Number		Test Parameter		Test Result
21	End-of-Travel Sensors	2	Read Tilt Sensor (VLM)	Static = Closed Sensor
		5	Read Dimmer Sensor (VL6)	Flashing = Open Sensor
		6	Read Color 1 Sensor (VL6)	
		7	Read Color 2 Sensor (VL6)	
22	Pan Encoder	9	Select MSD	Display Digit
23	Tilt Encoder	8	Select 2SD	Display Digit
		7	Select 3SD	Display Digit
		6	Select LSD	Display Digit
		0	Snap shot	Scroll Digits
24	Form And Function			Display Form And Function Value
				VL5: F=7
				VLM: F=8
				VL6: F=9
25	Data Loop-Back	9	External	Pass= 0 (Zero)
		8	Internal	Fail = E
26	Color 1 Step Mode		Increment = 1 Step CW	Static = Closed Sensor
			Decrement = 1 Step CCW	Flashing = Open Sensor
27	Color 2 Step Mode		Increment = 1 Step CW	Static = Closed Sensor
			Decrement = 1 Step CCW	Flashing = Open Sensor

Table 4-14: Program Mode Selection

Test Number		Test Parameter		Error Codes/Comments
30	Enter PGM Mode		Parameters do not store with tests.	Indicates test number for selection: flashing for deselection, P if invalid test number.
		9	Synchronized	Error code displays during test
31	Test Program	8	Unsynchronized	
32	Test Program	7	Sequential Mode 5 min.	
33	Test Program	6	Sequential Mode 2 min.	
34	Test Program	5	Sequential Mode 1 min.	
35	Test program	4	Sequential Mode 45 sec.	
36	Test Program	3	Sequential Mode 30 sec.	
37	Test Program	2	Sequential Mode 20 sec.	
38	Test Program	1	Sequential Mode 10 sec	
39	Test Program	0	Sequential Mode 5 sec.	

Table 4-15: VLM Default Test Programs

Test Number		Tests	Functions
31	Pan and Tilt	701	Pan, 25% Speed
		702	Tilt, 25% Speed
37	VL5 Functions	704	Edge, 25% Speed
		706	Color 1, 25% Speed
		707	Color 2, 25% speed
		708	Color 3, 25% Speed
38	VLM Spin	703	CW Spin, 50% Speed
39	VL6 Functions	703	Beam, 25% Speed
		704	Edge, 25% Speed
		705	Intensity, 25% Speed
		506	Color 1, Continuous Frame
		507	Color 2, Continuous Frame
60	Packup Cue		
61	Open/Bulb-Adjust Cue		

Table 4-16: Error History Selection

Test Number		Test Parameter		Test Result
40	Error History	0	All Errors	Sequence of three-character error codes
		1-9	Last Errors	
41	Clear Error History	none		Scrolling parallel bars
42	Error History	0	All Errors	Displays total number of errors.
	Count	1-9	Last Errors	Displays errors from last test only.
43	Set Scroll Speed	9	Scroll Speed (Slowest)	
		1-8	Scroll Speed (Medium)	
		0	Scroll Speed (Fastest)	

Table 4-17: Port Selection

Test Number		Test Parameter	
51	Select Port	0	All
		1	Port 1
		2	Port 2
		3	Port 3
		4	Port 4
		5	Port 5
		6	Port 6

Error Messages

All errors are accumulated and scrolled during each test; tests are not stopped by an error. The number of errors is stored and can be displayed. Error codes are displayed as follows:

Table 4-18: Error Messages

[Pn Er 103 - result]	
where P	is the port number indicator
n	is the port number (1 through 6)
Er	is the error indicator
1	is the assembly number
03	is the error type
result	is optional

If any errors are detected during calibration, the faulty mechanism is flagged as unavailable for further use. The corresponding error code and result are displayed until another test is selected. If any lamp head is manually impeded during calibration, further tests of pan/tilt mechanisms will not work properly. Detectable errors include the following:

- Failure to reset to zero - [Er 103] or [Er 203].
- Encoder not changing - [Er 104] or [Er 204].
- Hit sensor when not expecting to - [Er 511], [Er 611], or [Er 711].
- Did not hit sensor when expecting to - [Er 514], [Er 614], or [Er 714].

Some standard error messages include the following:

- [Er SoFT oPErATor] - Operator made a mistake, try again.
- [Er SoFT SW] - Software made a mistake, try it again.
- [Er HArD SW] - Software failed due to previously unknown bug, report the bug.
- [Er HArD HW] - Hardware has failed; repair the Smart Repeater unit.

Error History

The error history retains a list of the most recent 200 error codes produced since the list was cleared. When the list becomes full, new errors overwrite the oldest errors on the list. The list can be displayed or cleared at any time. The error history does not store test results.

To display error history, set thumbwheel switch to 40. Set test parameter to 0 to display all errors; set to any non-zero value to display only the errors from the last test run. To control scroll speed, test thumbwheel switch to 43 and set test parameter to select scroll speed.

To clear error history, set thumbwheel switch to 41.

To display the number of errors in the error history, set thumbwheel switch to 42. Set test parameter to 0 to display the total number of errors. To display the number of errors recorded for the last test run, set test parameter to any non-zero value.

Notes

APPENDIX A.

Reference Tables

This appendix contains the DMX512 information necessary for controlling Series 200/300 equipment.

- **Series 300 DMX Modes**
- **Channel Mapping**
- **Timing Channels**
- **Color Reference**

Series 300 DMX Modes

DMX Mode 1

Table A-1: DMX512 Mode 1 (8-bit with Reset)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VLM
1	1	External Dimmer*	Intensity	Intensity	Hi Byte Pan
	2	Pan	Pan	Pan	Lo Byte Pan
	3	Tilt	Tilt	Tilt	Hi Byte Tilt
	4	Blue	Blue	Wheel 1	Lo Byte Tilt
	5	Amber	Amber	Wheel 2	Rotation Speed >
	6	Magenta	Magenta	Beam Iris	Rotation Speed <
	7	Diffusion	Diffusion	Lens (Edge)	--
	8	Reset	Reset	Reset	Reset
2	9-16	--	--	--	--
3	17-24	--	--	--	--
4	25-32	--	--	--	--
5	33-40	--	--	--	--
6	41-48	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 2

Table A-2: DMX512 Mode 2 (8-bit Extended)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VLM
1	1	External Dimmer*	Intensity	Intensity	Hi Byte Pan
	2	Pan	Pan	Pan	Lo Byte Pan
	3	Tilt	Tilt	Tilt	Hi Byte Tilt
	4	Blue	Blue	Wheel 1	Lo Byte Tilt
	5	Amber	Amber	Wheel 2	Rotation Speed >
	6	Magenta	Magenta	Beam Iris	Rotation Speed <
	7	Diffusion	Diffusion	Lens (Edge)	--
	8	Focus Time	Focus Time	Focus Time	Focus Time
	9	Color Time	Color Time	Color Time	--
	10	Beam Time	Beam Time	Beam Time	--
	11	Reset	Reset	Reset	Reset
2	12-22	--	--	--	--
3	23-33	--	--	--	--
4	34-44	--	--	--	--
5	45-55	--	--	--	--
6	56-66	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 3

Table A-3: DMX513 Mode 3 (16-bit with Reset)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VLM
1	1	External Dimmer*	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Rotation Speed <
	7	Amber	Amber	Wheel 2	--
	8	Magenta	Magenta	Beam Iris	--
	9	Diffusion	Diffusion	Lens (Edge)	--
	10	Reset	Reset	Reset	Reset
2	11-20	--	--	--	--
3	21-30	--	--	--	--
4	31-40	--	--	--	--
5	41-50	--	--	--	--
6	51-60	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 4

Table A-4: DMX512 Mode 4 (16-bit Extended)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VLM
1	1	External Dimmer*	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Rotation Speed <
	7	Amber	Amber	Wheel 2	--
	8	Magenta	Magenta	Beam Iris	--
	9	Diffusion	Diffusion	Lens (Edge)	--
	10	Focus Time	Focus Time	Focus Time	Focus Time
	11	Color Time	Color Time	Color Time	--
	12	Beam Time	Beam Time	Beam Time	--
	13	Reset	Reset	Reset	Reset
2	14-26	--	--	--	--
3	27-39	--	--	--	--
4	40-52	--	--	--	--
5	53-65	--	--	--	--
6	66-78	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 5

Table A-5: DMX Mode 5 (16-bit with Reset)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VLM
1	1	External Dimmer*	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Reset
	8	Magenta	Magenta	Beam Iris	Beam Iris	--
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	--
	10	Reset	Reset	Strobe	Strobe	--
	11	--	--	Reset	Zoom	--
	12	--	--	--	Rotating Wheel	--
	13	--	--	--	Rotation/Index	--
	14	--	--	--	Reset	--
2	15-28	--	--	--	--	--
3	29-42	--	--	--	--	--
4	43-56	--	--	--	--	--
5	57-70	--	--	--	--	--
6	71-84	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 6

Table A-6: DMX Mode 6 (16-bit Extended)

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VLM
1	1	External Dimmer *	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Focus Time
	8	Magenta	Magenta	Beam Iris	Beam Iris	Reset
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	--
	10	Focus Time	Focus Time	Strobe	Strobe	--
	11	Color Time	Color Time	Focus Time	Focus Time	--
	12	Beam Time	Beam Time	Color Time	Rotating Wheel	--
	13	Reset	Reset	Beam Time	Rotation/Index	--
	14	--	--	Reset	Focus Time	--
	15	--	--	--	Color Time	--
	16	--	--	--	Beam Time	--
	17	--	--	--	Reset	--
2	18-34	--	--	--	--	--
3	35-51	--	--	--	--	--
4	52-68	--	--	--	--	--
5	69-85	--	--	--	--	--
6	86-102	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 7

Table A-7: DMX512 Mode 7 (16-bit with Reset) Smart Repeater Plus Unit ONLY

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U	VLM
1	1	External Dimmer*	Intensity	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tile
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Color 1 X	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Color 1 Y	--
	8	Magenta	Magenta	Beam Iris	Beam Iris	Color 2 X	--
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	Color 2 Y	--
	10	Reset	Reset	Strobe	Strobe	Beam Iris	Reset
	11	--	--	Reset	Zoom	Lens (Edge)	--
	12	--	--	--	Rotating Wheel	Zoom	--
	13	--	--	--	Rotation/Index	Strobe	--
	14	--	--	--	Reset	Fixed Wheel	--
	15	--	--	--	--	Rotating Wheel	--
	16	--	--	--	--	Rotation/ Index	--
	17	--	--	--	--	Reset	--
2	18-34	--	--	--	--	--	--
3	35-51	--	--	--	--	--	--
4	52-68	--	--	--	--	--	--
5	69-85	--	--	--	--	--	--
6	86-102	--	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 8

Table A-8: DMX512 Mode 8 (16-bit Extended) Smart Repeater Plus Unit ONLY

Port Number	DMX Channel	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U	VLM
1	1	External Dimmer*	Intensity	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Color 1 X	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Color 1 Y	--
	8	Magenta	Magenta	Beam Iris	Beam Iris	Color 2 X	--
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	Color 2 Y	--
	10	Focus Time	Focus Time	Strobe	Strobe	Beam Iris	Focus Time
	11	Color Time	Color Time	Focus Time	Zoom	Lens (Edge)	--
	12	Beam Time	Beam Time	Color Time	Rot. Wheel	Zoom	--
	13	Reset	Reset	Beam Time	Rotation/ Index	Strobe	Reset
	14	--	--	Reset	Focus Time	Fixed Wheel	--
	15	--	--	--	Color Time	Rot. Wheel	--
	16	--	--	--	Beam Time	Rotation/ Index	--
	17	--	--	--	Reset	Focus Time	--
	18	--	--	--	--	Color Time	--
	19	--	--	--	--	Beam Time	--
	20	--	--	--	--	Reset	--
2	21-40	--	--	--	--	--	--
3	41-60	--	--	--	--	--	--
4	61-80	--	--	--	--	--	--
5	81-100	--	--	--	--	--	--
6	101-120	--	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 9

Table A-9: DMX512 Mode 9 (16-bit with Reset) Smart Repeater Plus Unit ONLY

Port Number	DMX Chan.	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U	VL7B / VL7UB	VLM
1	1	External Dimmer*	Intensity	Intensity	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Color 1 X	Color 1 X	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Color 1 Y	Color 1 Y	--
	8	Magenta	Magenta	Beam Iris	Beam Iris	Color 2 X	Color 2 X	--
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	Color 2 Y	Color 2 Y	--
	10	Reset	Reset	Strobe	Strobe	Beam Iris	Lens (Edge)	Reset
	11	--	--	Reset	Zoom	Lens (Edge)	Zoom	--
	12	--	--	--	Rotating Wheel	Zoom	Strobe	--
	13	--	--	--	Rotation/ Index	Strobe	Rotating Wheel	--
	14	--	--	--	Reset	Fixed Wheel	Rotation /Index	--
	15	--	--	--	--	Rotating Wheel	Shutter 1 Left	--
	16	--	--	--	--	Rotation/ Index	Shutter 1 Right	--
	17	--	--	--	--	Reset	Shutter 2 Left	--
	18	--	--	--	--	--	Shutter 2 Right	--
	19	--	--	--	--	--	Shutter 3 Left	--
	20	--	--	--	--	--	Shutter 3 Right	--
	21	--	--	--	--	--	Shutter 4 Left	--
	22	--	--	--	--	--	Shutter 4 Right	--
	23	--	--	--	--	--	Shutter Rotation	--
	24	--	--	--	--	--	Reset	--
2	25-49	--	--	--	--	--	--	--
3	50-73	--	--	--	--	--	--	--
4	74-97	--	--	--	--	--	--	--
5	98-121	--	--	--	--	--	--	--
6	122-144	--	--	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

DMX Mode 10

Table A-10: DMX512 Mode 10 (16-bit Extended) Smart Repeater Plus Unit ONLY

Port Number	DMX Chan.	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U	VL7B / VL7UB	VLM
1	1	External Dimmer*	Intensity	Intensity	Intensity	Intensity	Intensity	Hi Byte Pan
	2	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Hi Byte Pan	Lo Byte Pan
	3	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Lo Byte Pan	Hi Byte Tilt
	4	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Hi Byte Tilt	Lo Byte Tilt
	5	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Lo Byte Tilt	Rotation Speed >
	6	Blue	Blue	Wheel 1	Wheel 1	Color 1 X	Color 1 X	Rotation Speed <
	7	Amber	Amber	Wheel 2	Wheel 2	Color 1 Y	Color 1 Y	--
	8	Magenta	Magenta	Beam Iris	Beam Iris	Color 2 X	Color 2 X	--
	9	Diffusion	Diffusion	Lens (Edge)	Lens (Edge)	Color 2 Y	Color 2 Y	--
	10	Focus Time	Focus Time	Strobe	Strobe	Beam Iris	Lens (Edge)	Focus TIme
	11	Color Time	Color Time	Focus Time	Rotating Wheel	Lens (Edge)	Zoom	--
	12	Beam Time	Beam Time	Color Time	Rotation/ Index	Zoom	Strobe	--
	13	Reset	Reset	Beam Time	Focus Time	Strobe	Rotating Wheel	Reset
	14	--	--	Reset	Color Time	Fixed Wheel	Rotation / Index	--
	15	--	--	--	Beam Time	Rotating Wheel	Shutter 1 Left	--
	16	--	--	--	Reset	Rotation/ Index	Shutter 1 Right	--
	17	--	--	--	--	Focus Time	Shutter 2 Left	--
	18	--	--	--	--	Color Time	Shutter 2 Right	--
	19	--	--	--	--	Beam Time	Shutter 3 Left	--
	20	--	--	--	--	Reset	Shutter 3 Right	--
	21	--	--	--	--	--	Shutter 4 Left	--
	22	--	--	--	--	--	Shutter 4 Right	--
	23	--	--	--	--	--	Shutter Rotation	--
	24	--	--	--	--	--	Focus Time	--
	25	--	--	--	--	--	Color Time	--
	26	--	--	--	--	--	Beam Time	--
	27	--	--	--	--	--	Reset	--
2	28-54	--	--	--	--	--	--	--

Table A-10: DMX512 Mode 10 (16-bit Extended) Smart Repeater Plus Unit ONLY (Continued)

Port Number	DMX Chan.	VL5 / VL5B	VL5Arc	VL6	VL6B / VL6C / VL6C+	VL7 / VL7U	VL7B / VL7UB	VLM
3	55-81	--	--	--	--	--	--	--
4	82-108	--	--	--	--	--	--	--
5	109-135	--	--	--	--	--	--	--
6	136-162	--	--	--	--	--	--	--

* When a DMX Power Pack is used, the first port channel controls the integral CD dimmer module for the VL5 and VL5B luminaires.

Channel Mapping

Series 200 DMX Channels

Table A-11: VL2C Channel Map

Channel	VL2C Parameter
1	Intensity
2	Pan Hi
3	Pan Lo
4	Tilt Hi
5	Tilt Lo
6	Wheel 1
7	Wheel 2
8	Beam
9	Edge
10	Gobo Wheel
11	Focus Time
12	Edge Time
13	Beam Time
14	Reset, Start and Douse

Table A-12: VL4 Channel Map

Channel	VL4 Parameter
1	Intensity
2	Pan Hi
3	Pan Lo
4	Tilt Hi
5	Tilt Lo
6	Blue
7	Amber
8	Magenta
9	Edge
10	Beam
11	Shutter
12	Focus Time
13	Color Time
14	Beam Time
15	Reset, Start and Douse

Parameter Mapping

VL2C Parameters

Table A-13: VL2C DMX Values for Color Wheels 1 & 2

Pos.	Color Wheel 1	Color Wheel 2	DMX Value
1	Open (no color)	Open (no color)	0-15
2	No Color Straw	Magenta	16-31
3	Color Correction	Light Pink	32-47
4	Lavender	Pink	48-63
5	Deep Red	Pale Lavender	64-79
6	Ultra Violet	Red	80-95
7	Dark Violet	Orange Red	96-111
8	Violet Blue	Orange	112-127
9	Blue Violet	Amber	128-143
10	Royal Blue	Yellow	144-159
11	Blue	Greenish Yellow	160-175
12	Turquoise Blue	Lt. Yellow Green	176-191
13	Medium Blue	Pale Yellow Green	192-207
14	Pale Med. Blue	Straw	208-223
15	Pale Blue	Light Straw	224-239
16	No Color Blue	Pale Straw	240-255

Table A-14: VL2C DMX Values for Gobo Control

Gobo	DMX Value
1 (open)	0-24
2	25-49
3	50-74
4	75-99
5	100-124
6	125-149
7	150-174
8	175-199
9	200-224
10	225-255

VL6/VL7 Parameters

Table A-15: VL6/VL6B/VL6C/VL6C+ & VL7/VL7U/VL7B/VL7UB DMX Values for Fixed Wheels

Wheel Step/Position		DMX Value	% Value
0	0	0-2	0
95		3-5	1
94		6-7	2
93		8-10	3
92	1/2	11-12	4
91		13-15	5
90		16-17	6
89		18-20	7
88	1	21-22	8
87		23-25	9
86		26-28	10
85		29-30	11
84	1-1/2	31-33	12
83		34-35	13
82		36-38	14
81		39-40	15
80	2	41-43	16
79		44-45	17
78		46-48	18
77		49-50	19
76	2-1/2	51-53	20
75		54-56	21
74		57-58	22
73		59-61	23
72	3	62-63	24
71		64-66	25
70		67-68	26
69		69-71	27
68	3-1/2	72-73	28
67		74-76	29

Wheel Step/Position		DMX Value	% Value
66		77-79	30
65		80-81	31
64	4	82-84	32
63		85-86	33
62		87-89	34
61		90-91	35
60	4 1/2	92-94	36
59		95-96	37
58		97-99	38
57		100-101	39
56	5	102-104	40
55		105-107	41
54		108-109	42
53		110-112	43
52	5-1/2	113-114	44
51		115-117	45
50		118-119	46
49		120-122	47
48	6	123-124	48
47		125-127	49
46		128-130	50
45		131-132	51
44	6-1/2	133-135	52
43		136-137	53
42		138-140	54
41		141-142	55
40	7	143-145	56
39		146-147	57
38		148-150	58
37		151-152	59

Table A-15: VL6/VL6B/VL6C/VL6C+ & VL7/VL7U/VL7B/VL7UB DMX Values for Fixed Wheels

Wheel Step/Position		DMX Value	% Value
36	7-1/2	153-155	60
35		156-158	61
34		159-160	62
33		161-163	63
32	8	164-165	64
31		166-168	65
30		169-170	66
29		171-173	67
28	8-1/2	174-175	68
27		176-178	69
26		179-181	70
25		182-183	71
24	9	184-186	72
23		187-188	73
22		189-191	74
21		192-193	75
20	9-1/2	194-196	76
19		197-198	77
18		199-201	78
17		202-203	79
16	10	204-206	80
15		207-209	81
14		210-211	82
13		212-214	83
12	10-1/2	215-216	84
11		217-219	85
10		220-221	86
9		222-224	87
8	11	225-226	88
7		227-229	89
6		230-232	90
5		233-234	91
4	11-1/2	235-237	92
3		238-239	93
2		240-242	94
1		243-244	95
Spin 1		245-247	96
Spin 2		248-249	97
Spin 3		250-252	98
Spin 4		253-254	99
Spin 5		255	100

The channel assigned to the rotating wheel selects the required gobo as follows:

Table A-16: VL6/VL7 Rotating Wheel Select

DMX Values	Percent Values	Action
156-255		Open
129-153	55	Gobo 5
102-128	45	Gobo 4
77-102	35	Gobo 3
53-76	25	Gobo 2
27-52	15	Gobo 1
0-26	5	Open

The channel assigned to the rotation/index controls the gobo position as follows:

Table A-17: VL6/VL7 Rotation/Index Control

DMX Values	% Values	Action
255	100	Fast CCW
254		22
253		21
252	99	20
251		19
250	98	18
249		17
248		16
247	97	15
246		14
245	96	13
244		12
243		11
242	95	10
241		9
240	94	8
239		7
238		6
237	93	5
236		4
235	92	3
234		2
233		1
232	91	Slow CCW
231		Stop
230	90	Stop
229		Stop
228		Slow CW
227	89	1
226		2
225		3
224	88	4
223		5
222	87	6
221		7
220		8
219	86	9
218		10
217	85	11
216		12
215		13
214	84	14
213		15
212	83	16
211		17
210		18
209	82	19
208		20
207	81	21
206		22
205	80	Fast CW
201-0	79-0	Index Pos.

Table A-18: VL6 Strobe

Value	Action
0 - 2	Open
3 - 5	Closed
6 - 7	Slow Random
8-10	Medium Random

Table A-19: VL6B Strobe

Value	Action
0 - 2	Open
3 - 5	Closed
6 - 7	Slow Random
8-10	Medium Random
11-12	Fast Random
13-255	Where 13 is greatest interval and 255 is least interval (fastest) strobe

Table A-20: VL7/VL7U/VL7B/VL7UB Strobe

Value	Action
0 - 2	Open
3 - 5	Closed
6 - 7	Slow Random
8 - 10	Medium Random
11 - 12	Fast Random
13 - 255	Where 13 is longest interval and 255 is shortest interval (fastest) strobe

Timing Channels

Channel Functions

Timing channel control improves the timed moves of certain groups of parameters. We provide three timing channels, one for Focus (Pan and Tilt), one for color parameters and one for beam parameters. Timing channels support time values of up to six minutes.

Table A-21: Channel Function / Timing Channel Relationship

Channel Function	Timing Channel		
	Focus Time	Color Time	Beam Time
Pan (Hi Byte/Lo Byte)	♦		
Tilt (Hi Byte/Lo Byte)	♦		
Blue		♦	
Amber		♦	
Magenta		♦	
Color Wheel		♦	
Diffusion			♦
Beam			♦
Edge			♦
Zoom			♦
Rotating Gobo			♦
Gobo Index (HiByte/LoByte)			♦
Shutter (all 9 motors)			♦

A timing value of zero is full speed. A time value of 100% (or 255 in DMX) causes the associated parameter(s) to follow cue fade time (console time) rather than the timing channel.

Timing Channel Mapping

Timing channels can be set in either % or 0-255 (DMX) modes, with the following values assigned:

Table A-22: Timing Channels Map

% Value	DMX	= Seconds
	0	Full Speed
	1	0.2
	2	0.4
1	3	0.6
	4	0.8
2	5	1
	6	1.2
	7	1.4
3	8	1.6
	9	1.8
4	10	2
	11	2.2
	12	2.4
5	13	2.6
	14	2.8
6	15	3
	16	3.2
	17	3.4
7	18	3.6
	19	3.8
8	20	4
	21	4.2
	22	4.4
9	23	4.6
	24	4.8
10	25	5
	26	5.2
	27	5.4
11	28	5.6
	29	5.8
	30	6
12	31	6.2
	32	6.4
13	33	6.6
	34	6.8
	35	7.0
14	36	7.2
	37	7.4
15	38	7.6
	39	7.8
	40	8
16	41	8.2
	42	8.4
17	43	8.6
	44	8.8

Table A-22: Timing Channels Map (Continued)

% Value	DMX	= Seconds
	45	9
18	46	9.2
	47	9.4
19	48	9.6
	49	9.8
	50	10
20	51	10.2
	52	10.4
	53	10.6
21	54	11
	55	11
22	56	12
	57	12
	58	13
23	59	13
	60	14
24	61	14
	62	14
	63	15
25	64	15
	65	16
26	66	16
	67	16
	68	17
27	69	17
	70	18
28	71	18
	72	18
	73	19
29	74	19
	75	20
30	76	20
	77	20
	78	21
31	79	21
	80	21
	81	22
32	82	22
	83	23
33	84	23
	85	23
	86	24
34	87	24
	88	25
35	89	25
	90	25
	91	26
36	92	26
	93	27

Table A-22: Timing Channels Map (Continued)

% Value	DMX	= Seconds
37	94	27
	95	27
	96	28
38	97	28
	98	29
39	99	29
	100	29
	101	30
40	102	30
	103	30
	104	31
41	105	31
	106	32
42	107	32
	108	32
	109	33
43	110	33
	111	34
44	112	34
	113	34
	114	35
45	115	35
	116	36
46	117	36
	118	36
	119	37
47	120	37
	121	38
48	122	38
	123	38
	124	39
49	125	39
	126	39
	127	40
50	128	40
	129	41
51	130	41
	131	41
	132	42
52	133	42
	134	43
53	135	43
	136	43
	137	44
54	138	44
	139	45
55	140	45
	141	45
	142	46

Table A-22: Timing Channels Map (Continued)

% Value	DMX	= Seconds
56	143	46
	144	47
57	145	47
	146	47
	147	48
58	148	48
	149	49
59	150	49
	151	49
	152	50
60	153	50
	154	50
	155	51
61	156	51
	157	52
62	158	52
	159	52
	160	53
63	161	53
	162	54
64	163	54
	164	54
	165	55
65	166	55
	167	56
66	168	56
	169	56
	170	57
67	171	57
	172	58
68	173	58
	174	58
	175	59
69	176	59
	177	59
	178	60
70	179	60
	180	65
71	181	65
	182	65
	183	70
72	184	70
	185	75
73	186	75
	187	75
	188	80
74	189	80
	190	85
75	191	85

Table A-22: Timing Channels Map (Continued)

% Value	DMX	= Seconds
	192	85
	193	90
76	194	90
	195	95
77	196	95
	197	95
	198	100
78	199	100
	200	110
79	201	110
	202	110
	203	120
80	204	120
	205	120
81	206	130
	207	130
	208	140
82	209	140
	210	140
	211	150
83	212	150
	213	160
84	214	160
	215	160
	216	170
85	217	170
	218	180
86	219	180
	220	180
	221	190
87	222	190
	223	200
88	224	200
	225	200
	226	210
89	227	210
	228	210
	229	220
90	230	220
	231	230
91	232	230
	233	230
	234	240
92	235	240
	236	250
93	237	250
	238	250
	239	260
94	240	260

Table A-22: Timing Channels Map (Continued)

% Value	DMX	= Seconds
	241	270
95	242	270
	243	270
	244	280
96	245	280
	246	290
97	247	290
	248	290
	249	300
98	250	300
	251	310
99	252	310
	253	310
	254	310
100	255	Follows Cue Data

Color Reference

VL2C and VL4 Color

Table A-23: VL2C & VL4 Color Reference

Color Name	VL No.	Similar To	VL2C (Wh 1/Wh 2)	VL4 (DMX Values)		
				Blue (6)	Amber (7)	Magenta (8)
Pink Tint	101	Lux 55	N/A	254	255	198
Bastard Amber	103	Lux 02	N/A	254	151	166
GAM Bastard Amber	104	GAM 325	N/A	255	158	163
Warm Bastard Amber	105	Lee 162	N/A	255	162	173
Pale Golden Amber	107	Lux 09	N/A	255	141	179
Light Amber	110	Lux 16, Lee 204	N/A	255	128	165
Light Flame	112	Lux 17	N/A	255	126	147
Medium Bastard Amber	115	Lux 04	N/A	255	126	147
Dark Bastard Amber	116	Lux 03	N/A	N/A	N/A	N/A
Warm Amber	122	Lee 176, Lux 01	N/A	255	141	152
Peach	125	GAM 320		255	122	135
Flesh Pink	131	Lux 34	N/A	255	160	132
Dark Pink	134	Lee 111	N/A	255	158	118
Medium Salmon	136	Lux 32	N/A	255	128	108
Salmon	138	Lux 41	N/A	254	104	90
Brite Pink	141	Lee 128	N/A	255	126	75
Dark Peach	145		N/A	255	128	87
Lee Magenta	149	Lee 113	N/A	255	111	53
Dark Salmon	151		N/A	255	97	48
Deep Salmon	155		N/A	255	105	34
Dark Red	161		4/4	N/A	N/A	N/A
Medium Red	164	Lux 27	4/8	255	0	0
Primary Red	168	Lee 106	0/5	255	0	29
Dark Orange	173	Lux 26	0/5	255	0	46
Light Red	177	GAM 235	N/A	255	106	44
Dark Orange	181		2/6	255	90	46
Orange	183	Lux 19, Lee 164	15/6	255	0	78
Medium Amber	187	Lux 22	15/6	255	0	98
Deep Golden Amber	201	GAM 345	15/7	255	47	109
Canary	205	Lux 21	2/8	255	62	173
Light Amber	208		0/8	255	67	225
Lee Orange	212	Lee 105	2/9	255	98	255
Chrome Orange	214	Lux 15, Lee 179	15/8	255	104	198

Table A-23: VL2C & VL4 Color Reference (Continued)

Color Name	VL No.	Similar To	VL2C (Wh 1/Wh 2)	VL4 (DMX Values)		
				Blue (6)	Amber (7)	Magenta (8)
Bright Yellow	219		1/9	255	106	255
Dark Straw	221		0/9	255	100	255
Deep Amber	223	Lee 104	0/9	254	111	255
Light Yellow	225	Lee 101	2/11	N/A	N/A	N/A
Straw	237	Lux 12	1/10	N/A	N/A	N/A
Light Straw	239		2/15	255	135	255
No Color Green	245	Lee 213, Lee 202	0/15	151	128	255
Pale Yellow-Green	251		14/12	N/A	N/A	N/A
Fern Green	254	Lee 122	13/14	0	137	255
Yellow-Green	256		10/9	85	87	255
Lime Green	257	Lee 139	11/11	95	107	255
Primary Green	259		10/11	85	116	255
Light Green	261		9/11	98	143	255
Moss Green	263		9/12	N/A	N/A	N/A
Lt. Blue Green	267		11/14	34	130	255
Kelly Green	268	Lux 94	12/14	48	126	255
Dark Green	270	Lee 124	10/13	96	117	255
Fluorescent Green	273		9/13	N/A	N/A	N/A
Dark Fluor. Green	275		8/15	N/A	N/A	N/A
Blue-Grass Green	281	GAM 690, GAM 440	10/14	N/A	N/A	N/A
Medium Blue-Green	284	Lee 116	9/14	99	136	230
Dark Peacock Green	286		8/13	N/A	N/A	N/A
Peacock Green	287	Lee 115	10/15	43	160	255
Dark Turquoise	289		11/15	43	165	255
Light Aqua	291		10/15	99	156	255
Aqua	295		8/14	108	189	255
Rosco Peacock Blue	298	Lux 73	N/A	116	140	255
Lee Steel Blue	299	Lee 117	N/A	130	136	255
1/4 CTB	301	Lee 203	N/A	210	175	255
1/2 CTB	303	Lee 202, Lux 61	N/A	255	191	255
Full CTB	307	Lee 201	15/0	146	177	255
City Blue	310	GAM 847, Poly-color 70	N/A	141	204	255
N.C. Blue	313	GAM 840, GAM 980	N/A	138	255	222
Slate Blue	318	Lee 161	N/A	N/A	N/A	N/A
Pale Blue	321	Lux 69	11/0	113	191	255
Lee Light Blue	325	Lee 118	10/0	51	203	255
Bright Blue	330	Lee 141	N/A	82	255	255
Medium Blue	342	Lee 132	9/0	103	254	169

Table A-23: VL2C & VL4 Color Reference (Continued)

Color Name	VL No.	Similar To	VL2C (Wh 1/Wh 2)	VL4 (DMX Values)		
				Blue (6)	Amber (7)	Magenta (8)
Sea Blue	345	Lux 68, GAM 810	11/2	117	255	255
Icy Blue	350		10/2	99	255	167
Just Blue	355	Lee 79	8/0	N/A	N/A	N/A
Primary Blue	359	Lux 83, GAM 850	9/3	N/A	N/A	N/A
Dark Steel Blue	365		7/15	N/A	N/A	N/A
Deep Blue	371		7/0	53	255	0
Dark Blue	374	Lee 120	8/4	71	255	46
Royal Blue	380	GAM 905	6/4	38	255	80
Dark UV	401		5/1	N/A	N/A	N/A
Indigo	403	Lux 59	5/0	100	255	101
Congo Blue	406	Lee 181	6/1	101	255	101
Darkest Lavender	409		12/1	109	255	109
Dark Rose Purple	411		3/4	101	255	118
Deep Lavender	415		12/4	77	255	121
Lilac	418		13/4	73	255	135
Special Dark Lavender	421		10/3	74	251	136
Cool Lavender	422	GAM 845	11/3	101	251	152
Pale Lavender	425		13/3	N/A	N/A	N/A
Mercury Vapor	429		13/4	46	255	118
Medium Violet	433	Lux 359	15/4	116	255	135
Dark Lavender	443	Lee 180	1/4	132	254	135
Lee Special Lavender	447	Lee 137	N/A	183	255	199
Twilight	451	GAM 915	N/A	145	255	255
Deep Lavender	455	GAM 948	15/3	123	255	135
Pale Lilac	461		2/4	136	255	139
Periwinkle	463	GAM 960, GAM 970	0/3	158	255	148
Dusty Lavender	466		15/2	181	255	199
No Color Lilac	468	Lux 52	1/2	216	255	165
Special Lavender	469	Lux 54	N/A	211	255	189
Dark Rose	471		3/1	134	255	97
Dark Fushia	474	Lux 358	14/1	132	255	97
Dark Follies Pink	476		15/1	255	254	67
Magenta	478	Lee 126	15/1	155	193	64
Hot Pink	480		0/1	255	193	64
Mauve	483		1/1	255	172	69
Follies Pink	489		N/A	255	163	84
Flesh Pink	491		N/A	255	255	115
Rose Purple	492	Lux 48	N/A	209	255	118
Carnation	494		N/A	255	199	131

Table A-23: VL2C & VL4 Color Reference (Continued)

Color Name	VL No.	Similar To	VL2C (Wh 1/Wh 2)	VL4 (DMX Values)		
				Blue (6)	Amber (7)	Magenta (8)
No Color Pink	495		0/2	255	185	131
Cool Bastard Amber	496	Lux 52, Lux 33	0/2	211	255	152
Dusty Rose	497		2/2	255	175	148
Rouge	498		N/A	206	173	152

VL5 Color

Note: DMX Values - First row are 0-100% values, second row are 0-255 values. Shaded boxes mean the matches are close, but not exact. "Similar To" reflects the gel indicated used with a 3200°K source. Due to the difference in color media and lamp source, color references are approximate and may vary by application.

Table A-24: VL5/VL5B/VL5Arc Color Chart

Color Name	No.	Similar To	VL5 DMX *	VL5Arc DMX *	VL5B DMX *
Pink Tint	101	Lux 55		0/15/36 0/39-40/92-94	
Bastard Amber	103	Lux 02	0/13/43 0/34-35/110-112	0/43/33 0/110-112/85-86	0/36/29 0/92-94/74-76
GAM Bastard Amber	104	GAM 325	0/29/45 0/74-76/115-117	0/43/50 0/110-112/128-130	0/38/29 0/97-99/74-76
Warm Bastard Amber	105	Lee 162	29/25/0 74-76/64-66/0	0/41/47 0/105-107/120-122	0/26/25 0/67-68/64-66
Pale Golden Amber	107	Lux 09	0/30/43 0/77-79/110-112	0/43/50 0/110-112/128-130	0/41/29 0/105-107/74-76
Light Amber	110	Lux 16 Lee 204	0/41/49 0/105-107/125-127	0/45/50 0/115-117/128-130	0/45/32 0/115-117/82-84
Light Flame	112	Lux 17	0/38/53 0/97-99/136-137	0/45/55 0/115-117/141-142	0/44/35 0/113-114/90-91
Medium Bastard Amber	115	Lux 04	0/33/50 0/85-86/128-130	0/43/53 0/110-112/136-137	0/42/33 0/108-109/85-86
Dark Bastard Amber	116	Lux 03	0/33/51 0/85-86/131-132	0/42/52 0/108-109/133-135	0/42/34 0/108-109/87-89
Warm Amber	122	Lee 176 Lux 01	0/25/57 0/64-66/146-147	0/43/56 0/110-112/143-145	0/43/37 0/110-112/95-96
Peach	125	GAM 320	0/40/58 0/102-104/148-150	0/45/60 0/115-117/153-155	0/49/41 0/125-127/105-107
Flesh Pink	131	Lux 34	40/30/45 102-104/77-79/115-117	15/40/60 39-40/102-104/153-155	0/38/38 0/97-99/97-99
Dark Pink	134	Lee 111	0/29/63 0/74-76/161-163	0/43/65 0/110-112/166-168	0/42/45 0/108-109/115-117
Medium Salmon	136	Lux 32	0/43/65 0/110-112/166-168	0/43/63 0/110-112/161-163	0/52/48 0/133-135/123-124
Salmon	138	Lux 41	0/50/75 0/128-130/192-193	0/45/80 0/115-117/204-206	0/60/50 0/153-155/128-130
Brite Pink	141	Lee 128	0/42/90 0/108-109/230-232	0/45/90 0/115-117/230-232	
Dark Peach	145		0/39/73 0/100-101/187-188	0/50/100 0/128-130/255	
Lee Magenta	149	Lee 113	0/50/100 0/128-130/255	0/55/100 0/141-142/255	
Dark Salmon	151		0/46/100 0/118-119/255	0/50/100 0/128-130/255	

Table A-24: VL5/VL5B/VL5Arc Color Chart (Continued)

Color Name	No.	Similar To	VL5 DMX *	VL5Arc DMX *	VL5B DMX *
Deep Salmon	155		0/55/100 0/141-142/255	0/55/100 0/141-142/255	
Medium Red	164	Lux 27	50/100/100 128-130/255/255	50/100/100 128-130/255/255	0/100/62 0/255/159-160
Primary Red	168	Lee 106	40/100/100 102-104/255/255	0/100/100 0/255/255	0/100/54 0/255/138-140
Dark Orange	173	Lux 26	0/56/100 0/143-145/255	0/100/100 0/255/255	0/75/52 0/192-193/133-135
Light Red	177	GAM 235	0/50/100 0/128-130/255	25/55/100 64-66/141-142/255	
Dark Orange	181		0/100/90 0/255/230-232	0/100/90 0/255/230-232	0/100/54 0/255/138-140
Orange	183	Lux 19 Lee 164	0/100/75 0/255/192-193	0/100/80 0/255/204-206	0/100/50 0/255/128-130
Medium Amber	187	Lux 22	0/78/72 0/199-201/184-186	0/75/69 0/192-193/176-178	0/87/47 0/222-224/120-122
Deep Golden Amber	201	GAM 345	0/50/63 0/128-130/161-163	0/70/65 0/179-181/166-168	0/75/43 0/192-193/110-112
Canary	205	Lux 21	0/83/57 0/212-214/146-147	0/82/59 0/210-211/151-152	0/100/38 0/255/97-99
Light Amber	208		0/83/50 0/212-214/128-130	0/100/57 0/255/146-147	0/100/30 0/255/77-79
Lee Orange	212	Lee 105	0/83/50 0/212-214/128-130	0/100/53 0/255/136-137	0/80/35 0/204-206/90-91
Chrome Orange	214	Lux 15 Lee 179	0/100/40 0/255/102-104	0/100/53 0/255/136-137	0/100/27 0/255/69-71
Bright Yellow	219		0/100/0 0/255/0	0/100/50 0/255/128-130	0/100/0 0/255/0
Dark Straw	221		0/75/40 0/192-193/102-104	0/100/35 0/255/90-91	0/85/20 0/217-219/51-53
Deep Amber	223	Lee 104	0/56/40 0/143-145/102-104	0/80/40 0/204-206/102-104	0/59/27 0/151-152/69-71
Light Yellow	225	Lee 101	0/58/0 0/148-150/0	0/65/41 0/166-168/105-107	0/58/0 0/148-150/0
Straw	237	Lux 12	0/53/5 0/136-137/13-15	0/56/41 0/143-145/105-107	0/53/0 0/136-137/0
Light Straw	239		0/43/0 0/110-112/0	0/43/40 0/110-112/102-104	0/42/0 0/108-109/0
No Color Green	245	Lee 213 with Lee 202		0/35/10 0/90-91/26-28	42/35/0 108-109/90-91/0
Pale Yellow-Green	251				0/55/65 0/141-142/166-168
Fern Green	254	Lee 122			60/60/0 153-155/153-155/0
Yellow-Green	256				70/100/0 179-181/255/0
Lime Green	257	Lee 139	100/72/0 255/184-186/0	100/85/0 255/217-219/0	0/80/100 0/204-206/255

Table A-24: VL5/VL5B/VL5Arc Color Chart (Continued)

Color Name	No.	Similar To	VL5 DMX *	VL5Arc DMX *	VL5B DMX *
Primary Green	259		100/64/0 255/164-165/0	100/64/0 255/164-165/0	0/84/100 0/215-216/255
Light Green	261		100/60/0 255/153-155/0	100/60/0 255/153-155/0	0/65/100 0/166-168/255
Moss Green	263		100/52/0 255/133-135/0	100/51/0 255/131-132/0	0/56/100 0/143-145/255
Light Blue-Green	267				90/35/0 230-232/90-91/0
Kelly Green	268	Lux 94			71/40/0 182-183/102-104/0
Dark Green	270	Lee 124		100/44/0 255/113-114/0	0/58/75 0/148-150/192-193
Fluorescent Green	273		100/50/0 255/128-130/0	100/45/0 255/115-117/0	0/50/80 0/128-130/204-206
Dark Fluor. Green	275		100/45/0 255/115-117/0	100/46/0 255/118-119/0	0/52/100 0/133-135/255
Blue-Grass Green	281	GAM 690 with GAM 440	87/44/0 222-224/113-114/0	100/44/0 255/113-114/0	0/50/75 0/128-130/192-193
Medium Blue-Green	284	Lee 116	100/39/0 255/100-101/0	100/43/0 255/110-112/0	0/20/100 0/51-53/255
Dark Peacock Green	286				0/49/75 0/125-127/192-193
Peacock Green	287	Lee 115			75/0/0 192-193/0/0
Dark Turquoise	289				65/30/0 166-168/77-79/0
Light Aqua	291		100/37/0 255/95-96/0	100/39/0 255/100-101/0	
Aqua	295		87/0/0 222-224/0/0	100/25/0 255/64-66/0	0/25/75 0/64-66/192-193
Rosco Peacock Blue	298	Lux 73			60/0/0 153-155/0/0
Lee Steel Blue	299	Lee 117			49/34/0 125-127/87-89/0
1/4 CTB	301	Lee 203		0/38/35 0/97-99/90-91	37/25/0 95-96/64-66/0
1/2 CTB	303	Lee 202 Lux 61		10/25/35 26-28/64-66/90-91	36/0/0 92-94/0/0
Full CTB	307	Lee 201			47/0/0 120-122/0/0
City Blue	310	GAM 847 Polycolor 70			60/0/35 153-155/0/90-91
N.C. Blue	313	GAM 840 with GAM 980			63/0/40 161-163/0/102-104
Slate Blue	318	Lee 161			63/0/35 161-163/0/90-91
Pale Blue	321	Lux 69			
Lee Light Blue	325	Lee 118	85/20/0 217-219/51-53/0	90/30/0 230-232/77-79/0	29/0/72 74-76/0/184-186

Table A-24: VL5/VL5B/VL5Arc Color Chart (Continued)

Color Name	No.	Similar To	VL5 DMX *	VL5Arc DMX *	VL5B DMX *
Bright Blue	330	Lee 141	78/0/0 199-201/0/0	100/0/0 255/0/0	50/0/65 128-130/0/166-168
Medium Blue	342	Lee 132	65/0/0 166-168/0/0	65/0/0 166-168/0/0	
Sea Blue	345	Lux 68 GAM 810		100/0/45 255/0/115-117	60/0/60 153-155/0/153-155
Icy Blue	350	Lux 68	100/0/55 255/0/141-142	100/0/50 255/0/128-130	100/0/52 255/0/133-135
Just Blue	355	Lee 79	69/0/50 176-178/0/128-130	70/0/50 179-181/0/128-130	
Primary Blue	359	Lux 83 GAM 850	73/0/56 187-188/0/143-145	70/0/52 179-181/0/133-135	
Deep Blue	371		100/0/100 255/0/255	100/0/100 255/0/255	
Dark Blue	374	Lee 120	85/0/100 217-219/0/255	100/0/80 255/0/204-206	
Royal Blue	380	GAM 905	100/0/75 255/0/192-193	67/0/89 171-173/0/227-229	
Indigo	403	Lux 59	62/0/100 159-160/0/255	55/0/55 141-142/0/141-142	
Congo Blue	406	Lee 181	63/0/100 161-163/0/255	57/0/60 146-147/0/153-155	
Darkest Lavender	409		62/0/100 159-160/0/255	52/0/70 133-135/0/179-181	
Dark Rose Purple	411		70/0/60 179-181/0/153-155	60/0/55 153-155/0/141-142	
Deep Lavender	415		70/0/60 179-181/0/153-155	55/0/40 141-142/0/102-104	
Lilac	418		66/0/56 169-170/0/143-145	57/0/45 1461-47/0/115-117	
Special Dark Lavender	421		75/0/57 192-193/0/146-147	55/0/37 141-142/0/95-96	
Cool Lavender	422	GAM 845	72/0/55 184-186/0/141-142	55/0/30 141-142/0/77-79	
Pale Lavender	425				
Mercury Vapor	429			53/0/33 136-137/0/85-86	
Medium Violet	433	Lux 359	61/0/43 155-156/0/110-112	52/0/37 133-135/0/95-96	
Dark Lavender	443	Lee 180	53/0/22 136-137/0/57-58	47/0/36 120-121/0/92-94	
Lee Special Lavender	447	Lee 137		30/0/0 77-79/0/0	
Twilight	451	GAM 915			60/0/35 153-155/0/90-91
Deep Lavender	455	GAM 948	56/0/40 143-145/0/102-104	48/0/35 123-124/0/90-91	50/0/52 128-130/0/133-135
Pale Lilac	461		55/0/30 141-142/0/77-79	42/0/45 108-109/0/115-117	40/0/50 102-104/0/128-130

Table A-24: VL5/VL5B/VL5Arc Color Chart (Continued)

Color Name	No.	Similar To	VL5 DMX *	VL5Arc DMX *	VL5B DMX *
Periwinkle	463	GAM 960 with GAM 970	51/0/0 131-132/0/0	44/0/40 113-114/0/102-104	47/0/47 120-122/0/120-122
Dusty Lavender	466			30/0/0 77-79/0/0	50/0/34 128-130/0/87-89
No Color Lilac	468	Lux 52		28/0/48 72-73/0/123-124	38/0/30 97-99/0/77-79
Special Lavender	469	Lux 54		22/0/41 57-58/0/105-107	39/0/28 100-101/0/72-73
Dark Rose	471		59/0/63 151-152/0/161-163	45/0/70 115-117/0/179-181	
Dark Fuchsia	474	Lux 358 with Lux 60	56/0/65 143-145/0/166-168	47/0/70 120-122/0/179-181	
Dark Follies Pink	476		50/0/68 128-130/0/174-175	36/0/68 92-94/0/174-175	
Magenta	478	Lee 126	51/0/78 131-132/0/199-201		
Hot Pink	480		42/0/100 108-109/0/255		
Mauve	483		42/0/70 108-109/0/179-181		
Follies Pink	489		0/0/77 0/0/197-198		
Flesh Pink	491		45/0/45 115-117/0/115-117	0/32/65 0/82-84/166-168	0/0/46 0/0/118-119
Rose Purple	492	Lux 48 with Lux 60		32/40/65 82-84/102-104/166-168	0/29/47 0/74-76/120-122
Carnation	494			0/0/53 0/0/136-137	0/0/40 0/0/102-104
No Color Pink	495		42/0/38 108-109/0/97-99	0/35/58 0/90-91/148-150	0/0/38 0/0/97-99
Cool Bastard Amber	496	Lux 52 with Lux 33			35/0/39 90-91/0/100-101
Dusty Rose	497			0/35/53 0/90-91/136-137	0/20/35 0/51-53/90-91
Rouge	498		35/0/40 90-91/0/102-104	10/37/53 26-28/95-96/136-137	0/22/35 0/57-58/90-91

* The first value adjusts blue, the second adjusts amber and the third adjusts magenta.

VL6 Color

Table A-25: VL6/VL6B/VL6C/VL6C+ Standard Colors

Standard Set		Similar To...*
0020	Magenta	GAM 995 & GAM 155
0150	Cool Pink	GAM 960 & GAM 970
0240	Light Red	GAM 235
0320	Flesh Pink	Lux 52 & Lux 33
0440	Orange	Lux 19 & Lee 164
0540	Yellow	Lee 101 & Lee 138
0660	Green	Lee 139
0820	Light Blue Green	Lux 69
0850	Dark Blue	Lee 120
0960	Deep Lavender	GAM 948
0990	Congo Blue	Lee 181

Table A-26: VL6/VL6B/VL6C/VL6C+ Rental Colors

Rental Access		Similar To...*
0080	Cherry	Lux 48
0335	Middle Rose	Lee 110
0350	No Color Lavender	Lux 55
0360	Warm Bastard Amber	GAM 363
0370	Pale Lime	GAM 515 & GAM 820
0390	Color Correction	3200°K 0 Green
0410	Deep Straw	Lux 15 or Lee 179
0430	Deep Golden Amber	GAM 345
0680	Blue-Grass	GAM 690 & GAM 470
0735	Peacock Green	Lee 115
0805	Sea Blue	GAM 810 & Lux 68
0810	Daylight Blue	Lee 201
0830	Pale Blue	Lee 201
0840	Light Steel Blue	GAM 840 & GAM 980
0845	Slate Blue	Lux 78 & Lux 64
0865	Night Sky Blue	Lux 83 & GAM 850
0870	Bright Blue	Lux 79
0880	Dark Blue	GAM 905
0930	Special Lavender	GAM 882 & GAM 980
0970	Violet	Lux 359 & Lux 51
0980	Dark Lavender	Lee 180
0983	Purple	GAM 950
0985	Dark Fuchsia	Lux 358 & Lux 60

* Matched to an ellipsoidal reflector spotlight with a 3200°K incandescent source.

VL7 Color

Table A-27: VL7/VL7U/VL7B/VL7UB Color Chart

Color Name	Number	Similar To	VL7 Spot DMX
Pink Tint	101	Lux 55	94/53/51/27 240/135/131/70
Bastard Amber	103	Lux 02	85/67/94/45 218/172/240/116
GAM Bastard Amber	104	GAM 325	94/71/94/56 240/181/240/144
Warm Bastard Amber	105	Lee 162	80/56/76/100 204/143/195/255
Pale Golden Amber	107	Lux 09	81/71/78/55 209/181/199/140
Light Amber	110	Lux 16 Lee 204	83/77/80/60 212/196/205/154
Light Flame	112	Lux 17	86/75/80/56 220/192/203/143
Medium Bastard Amber	115	Lux 04	86/66/80/59 220/167/203/151
Dark Bastard Amber	116	Lux 03	88/66/79/72 224/168/201/184
Warm Amber	122	Lee 176 Lux 01	87/73/73/64 223/185/185/162
Peach	125	GAM 320	87/86/48/42 220/220/122/108
Flesh Pink	131	Lux 34	96/80/61/33 246/205/155/85
Dark Pink	134	Lee 111	99/77/61/43 254/197/155/110
Medium Salmon	136	Lux 32	96/84/0/0 250/214/0/0
Salmon	138	Lux 41	100/96/0/0 255/244/0/0
Brite Pink	141	Lee 128	100/86/35/100 255/220/90/255
Dark Peach	145		100/85/53/100 255/218/134/255
Lee Magenta	149	Lee 113	100/96/34/100 255/244/86/255
Dark Salmon	151		100/92/38/75 255/235/97/192
Deep Salmon	155		100/98/45/100 255/250/116/255
Dark Red	161		Option -Fixed Gobo Wheel
Medium Red	164	Lux 27	
Primary Red	168	Lee 106	
Dark Orange	173	Lux 26	

Table A-27: VL7/VL7U/VL7B/VL7UB Color Chart (Continued)

Color Name	Number	Similar To	VL7 Spot DMX
Light Red	177	GAM 235	100/98/44/100 255/251/112/255
Dark Orange	181		
Orange	183	Lux 19 Lee 164	100/100/100/100 255/255/255/255
Medium Amber	187	Lux 22	100/92/100/100 255/223/255/255
Deep Golden Amber	201	GAM 345	100/85/100/100 255/217/255/255
Canary	205	Lux 21	93/83/100/100 237/212/255/255
Light Amber	208		86/100/100/100 291/255/255/255
Lee Orange	212	Lee 105	89/86/100/100 226/219/255/255
Chrome Orange	214	Lux 15 Lee 179	85/82/95/100 217/209/242/255
Bright Yellow	219		79/90/100/100 201/230/255/255
Dark Straw	221		82/99/100/100 209/252/255/255
Deep Amber	223	Lee 104	81/78/100/100 207/199/255/255
Light Yellow	225	Lee 101	72/84/100/100 184/214/255/255
Straw	237	Lux 12	79/67/100/100 203/170/255/255
Light Straw	239		76/79/86/50 193/201/220/128
No Color Green	245	Lee 213 & Lee 202	59/56/100/6 150/143/255/16
Pale Yellow-Green	251		60/85/0/0 152/216/0/0
Fern Green	254	Lee 122	53/78/81/70 134/199/206/178
Yellow-Green	256		42/100/84/87 107/255/242/255
Lime Green	257	Lee 139	47/100/95/100 121/255/242/255
Primary Green	259		39/97/87/100 99/247/223/255
Light Green	261		47/100/17/86 119/255/44/219
Moss Green	263		37/100/0/63 94/255/0/160
Light Blue-Green	267		41/73/0/0 104/184/0/0
Kelly Green	268	Lux 94	47/80/0/47 121/203/0/121

Table A-27: VL7/VL7U/VL7B/VL7UB Color Chart (Continued)

Color Name	Number	Similar To	VL7 Spot DMX
Dark Green	270	Lee 124	36/90/0/0 93/229/0/0
Fluorescent Green	273		37/85/9/83 94/218/23/211
Dark Fluor. Green	275		32/97/16/27 82/247/40/69
Blue-Grass Green	281	GAM 690 & GAM 440	29/84/0/0 73/214/0/0
Medium Blue-Green	284	Lee 116	28/87/0/67 71/221/0/170
Dark Peacock Green	286		31/82/0/70 79/209/0/178
Peacock Green	287	Lee 115	27/82/14/27 68/209/36/68
Dark Turquoise	289		26/80/0/0 66/204/0/0
Light Aqua	291		28/71/0/59 71/180/0/151
Aqua	295		25/78/16/77 63/200/40/197
Rosco Peacock Blue	298	Lux 73	41/62/3/53 105/159/7/136
Lee Steel Blue	299	Lee 117	41/52/75/7 104/132/190/17
1/4 CTB	301	Lee 203	
1/2 CTB	303	Lee 202 Lux 61	
Full CTB	307	Lee 201	
City Blue	310	GAM 847 Polycolor 70	77/56/20/54 196/143/52/138
N.C. Blue	313	GAM 840 & GAM 980	27/47/30/55 70/121/77/139
Slate Blue	318	Lee 161	26/53/10/41 67/135/26/105
Pale Blue	321	Lux 69	22/71/9/64 56/182/23/164
Lee Light Blue	325	Lee 118	28/65/9/61 72/167/23/155
Bright Blue	330	Lee 141	44/45/11/77 112/114/28/197
Medium Blue	342	Lee 132	0/28/9/100 0/71/24/255
Sea Blue	345	Lux 68 GAM 810	0/39/7/72 0/99/16/184
Icy Blue	350	Lux 68	12/48/13/100 30/123/32/255
Just Blue	355	Lee 79	

Table A-27: VL7/VL7U/VL7B/VL7UB Color Chart (Continued)

Color Name	Number	Similar To	VL7 Spot DMX
Primary Blue	359	Lux 83 GAM 850	15/84/47/85 38/215/120/217
Dark Steel Blue	365		15/100/47/100 38/255/120/255
Deep Blue	371	Lee 120	9/100/55/57 24/255/141/146
Dark Blue	374	GAM 905	9/100/58/90 24/255/148/230
Royal Blue	380	Lux 59	3/100/35/100 7/255/88/25
Indigo	403	Lee 181	0/92/69/100 0/234/175/255
Congo Blue	406		0/100/67/100 0/255/172/255
Darkest Lavender	409		0/83/51/100 0/211/131/255
Dark Rose Purple	411		0/78/66/69 0/200/169/253
Deep Lavender	415		7/85/42/55 17/216/107/139
Lilac	418		0/76/27/41 0/194/70/104
Special Dark Lavender	421	GAM 845	0/74/15/100 0/189/37/255
Cool Lavender	422		0/58/20/100 0/147/50/255
Pale Lavender	425		0/76/10/62 0/195/25/167
Mercury Vapor	429	Lux 359	0/79/33/45 0/202/83/115
Medium Violet	433	Lee 180	0/71/10/67 0/181/26/170
Dark Lavender	443	Lee 180	0/72/64/61 0/183/163/155
Lee Special Lavender	447	Lee 137	0/0/41/41 0/0/105/105
Twilight	451	GAM 915	12/71/29/38 30/180/75/97
Deep Lavender	455	GAM 948	0/84/61/70 0/214/156/178
Pale Lilac	461		0/77/61/45 0/197/156/114
Periwinkle	463	GAM 960 & GAM 970	0/0/58/64 0/0/149/163
Dusty Lavender	466		0/39/60/38 0/99/154/97
No Color Lilac	468	Lux 52	100/57/66/42 255/145/169/106

Table A-27: VL7/VL7U/VL7B/VL7UB Color Chart (Continued)

Color Name	Number	Similar To	VL7 Spot DMX
Special Lavender	469	Lux 54	100/44/71/50 255/113/180/128
Dark Rose	471		
Dark Fushia	474	Lux 358 & Lux 60	100/62/47/100 255/157/119/255
Dark Follies Pink	476		100/69/53/100 255/177/134/255
Magenta	478	Lee 126	
Hot Pink	480		
Mauve	483		
Follies Pink	489		100/71/48/100 255/177/124/255
Flesh Pink	491		0/0/59/48 0/0/152/123
Rose Purple	492	Lux 48 & Lux 60	100/63/59/100 255/161/150/255
Carnation	494		100/59/59/56 255/151/150/143
No Color Pink	495		100/52/59/50 255/133/150/128
Cool Bastard Amber	496	Lux 52 & Lux 33	85/59/53/42 217/151/134/107
Dusty Rose	497		80/73/53/40 205/186/134/124
Rouge	498		96/73/53/40 244/187/134/101

Note: DMX Values - First row are 0–100% values, second row are 0–255 values. VL7 referencing is for Plate 1 Color/Plate 1 Saturation/Plate 2 Color/Plate 2 Saturation.

APPENDIX B.

Glossary

This glossary provides useful terms associated with Series 200/300 equipment and DMX512 systems.

Glossary of Terms

Active An intensity value greater than zero (1-100%).

Address A numerical "name" given to a device on a DMX512 line indicating which of 512 possible channels it will respond to.

Align (lamp) The process of adjusting the lamp within the reflector to obtain the desired output quality of the beam.

APS6 Module The lamp power supply (ballast) for the arc lamps found in the VL6 and VL7 spot luminaires, and in the VL5Arc wash luminaire.

APS6 Trunk Cable Multi-conductor cable used to provide six circuits of arc lamp power to VARI✻LITE Series 300 luminaires. Differs from industry standard six circuit Socopex cable by using pin 19 as a shield to eliminate RF noise, which can interfere with sound systems. Can be used with incandescent lamps.

Arc Lamp A type of lamp which creates light by forming an arc of electricity. Brightness is achieved by including gasses and metals within the envelope of the lamp which dissolve and give off a bright light. Arc lamps must be dimmed mechanically because electrical dimming will extinguish the arc. Arc lamps used in Series 300 luminaires will not strike when hot.

Attribute An individual controllable aspect of a luminaire: pan, tilt, color, etc. Also known as "parameter."

Beam 1)The size, shape and sharpness of image of the light beam as projected on stage. 2)A function of the luminaire related to the size, shape, and sharpness of the light beam, specified by beam and edge data, and use of gobos (patterns) as required.

Broadcast Digital data signals transmitted from the control console to the luminaires and interface devices. The signal is received by all luminaire simultaneously and interpreted by each individually.

Channel A control reference which collects a device's associated thumbwheel address(es) (device, lamp power, etc.) and maps them to a single selectable number. Channels are assigned via the patch setup. (Also referred to as a "Control Channel")

Console Timing Time value in seconds or minutes applied to an entire cue.

C3 Dimmer A current sensing dimmer that can be installed in a Modular Rack SixPack Chassis to control the intensity of a VL5 or VL5B wash luminaires.

Cue A programmed event that can be played back on any submaster. A cue can be a crossfade or effect. 10,000 cues can be recorded, numbered from .01 to 9999.99.

Dimmer Device used to control the relative output (or intensity) of an incandescent lamp.

DMX/ DMX512 The universally accepted lighting control protocol in the entertainment industry. A console uses this protocol to control specific devices in a lighting system. A DMX512 data channel is eight bits of absolute parameter data. A DMX512 data packet is a group of 512 data channels, over a value range of 256 steps.

DMX512 Cable Industry standard cable consists of two twisted pair and a shield, and 5-pin XLR style connectors. The pin out is: pin 1 = common (shield), pin 2 = data -, pin 3 = data +. The second pair (pins 4 & 5) may be used for a secondary data link; in VARI*LITE equipment, these pins are not used.

DMX Power Pack The DMX Power Pack (DPP) is a portable electronics chassis that provides lamp power and control to Series 300 luminaires.

DMX Universe A group of up to 512 DMX channels. Consoles may have more than one universe, usually labeled in groups of 512.

Douse To de-energize a luminaire lamp. (Douse is unrelated to intensity states.)

Epic Connector A six-pin, three-phase 35 amp connector found on 8/5 wire used to provide power to a SixPack chassis. Also found on the back of a mod rack.

Fan-In (Break-In) 6 male plugs to female multicore connector. In the case of Series 300 equipment, a Socapex connector.

Fan-Out (Break-Out) A male multicore connector to 6 female plugs. In the case of Series 300 equipment, a Socapex connector.

Feeder In the case of Series 300 equipment, 2/0 double-insulated wire, rated at 225 amps, with 4\0 Cam-Lok connectors on either end, color coded by phase, neutral and ground.

Fixture Orientation Based on the direction the pigtail points as it exits the fixture.

Flipped Focus When one or more fixtures inadvertently move differently from others in the system.

Focus The point to which the light beam is directed. Also, a function of the luminaire related to the direction of the beam as specified by pan and/or tilt data.

Frame A luminaire mechanism which allows framing of the light beam.

Gobo A pattern (template) used to create backgrounds or texture when projected on to scenery or cycloramas, or to create the illusion of natural elements such as fire, windows or tree leaves.

Hard Reset Restarts luminaires and reloads operating system and cue data.

Home Position Pan and Tilt values at 50%. Also called "Zero Position" or a "50/50" cue or group.

Hubbell Connector A five-pin, three-phase connector found on 8/5 wire, used to provide power to SixPack Chassis, when used with the proper Epic to Hubbell adapter.

Indexing A function of a rotating gobo mechanism.

Intensity A value placed on the relative brightness of a lighting fixture; 100% is considered "full", and 0% is considered "out".

Lamp	Light source consisting of filament or electrodes, base, and envelope or "bulb".
Lamp Cable	Vari-Lite supplied cable that extends the fixture pigtail to a Smart Repeater unit.
Luminaire Calibration	The process of a luminaire finding its end stops for all parameters.
Mini-Stepping	Allows for smoother movement of color and gobo wheels in a VL6 spot luminaire.
Mode	Software contained within the Smart Repeater unit allowing for different control options for luminaires.
Modular (Mod) Rack	A power distribution and storage rack for SixPack Chassis. The mod rack is fitted for 200A Cam-Lok input, with six Epic connectors for individual outputs for up to four rack-mounted chassis and up to two auxiliary chassis. The mod rack also has a space for one SPC-36 controller for control of the modules within the chassis.
Output Port	One of the six plugs on the long side of a Smart Repeater unit, with port one being closest to the Socapex connector.
Palette	Term for groups of groups; i.e. all the color groups would be considered the Color Palette, all the beam groups would be the Beam Palette, etc.
Pan	The 360° movement of the luminaire around the axis of the yoke.
Parameter	An individual controllable aspect of a luminaire: pan, tilt, color, etc. Also known as "attribute."
Part Cue	Basically a "cue within a cue". A portion of a cue with a time applied that is different than the cue time.
Patch	The act of assigning a DMX512 channel to a control channel on a console.
Pigtail	Cable found at the top of a Series 300 fixture.
Reply	Digital data signals transmitted from each luminaire to the console. Only one luminaire may transmit at a time, in response to a request from the console.
Signal	Control protocol from a lighting console or interface.
SixPack Chassis	Case used for lamp power distribution. Each chassis can contain up to six modules - APS6 and/or C3 in any combination. Each slot in the chassis corresponds to an output port on the Smart Repeater unit. The SixPack Chassis connects to the Smart Repeater unit through an APS Cable or standard Socopex cable (if no APS6 modules are used).
Show File	A file containing all programmed cue data.
Shutter	A mechanism which controls the douser or strobe action of luminaires capable of this function.
Smart Repeater	The Smart Repeater unit is the hub for up to six Series 300 luminaires. The Smart Repeater unit s also an interface between the control system and the luminaires. It consolidates the three things necessary to run Series 300 luminaires into one lamp cable: Control Signal, Lamp power and Motor/Control power.

Socapex Cable — Industry standard multicore cable is used to distribute lamp power to luminaires. It is often created using 19-pin Socopex or Veam connectors and 12/18 cable for six 20A circuits.

Splitter (Isolator) — Device used to optically isolate and split a DMX512 signal. Note: A DMX "two-fer" cannot be used to divide a signal.

Start — To energize a luminaire arc lamp (applies to arc-lamp luminaires only).

Tails — In the case of Series 300 equipment, 2/0 double-insulated wire, rated at 225 amps, with 4\0 Cam-Lok connectors on one end color coded by phase, neutral and ground and bare wire on the other, or 8/5 multicore wire with a female connector (Hubbell or Epic) on one end, and bare wire on the other.

Terminate/ Termination — Termination refers to the dampening of DMX512 signal at the end of the transmission line. Termination is created by placing a 100 ohm resistor between pins 2 and 3 of the DMX512 line. Often, there is a switch on DMX512 devices to do this internally. If not, a terminator is provided in the form of an XLR connector with the proper resistor between pins 2 and 3 to be placed in the DMX Thru port on the device.

Test Software — Software resident in the Smart Repeater unit that allows for troubleshooting of a Series 300 luminaire.

Three-Phase Power — In order to manufacture electricity efficiently, it is created in what is known as three "phases". In other words, in its creation, the sine wave of alternating current are offset by 120°. The VARI❋LITE system runs on three-phase power, as indicated by the five Cam-Lok connectors on the mod rack - Phase X, Phase Y, Phase Z, Neutral and Ground. Each phase in a 200A feed can support 200A of equipment. To adequately power the same amount of equipment on a single phase, you would need a 600A feed.

Thumb-wheel Switch — Three digit switching device used to set the range of channels a particular Smart Repeater unit or other Series 300 hardware device looks at for control information. Also used to set the operating mode of a Smart Repeater unit.

Tilt — The movement of the luminaire around the axis of the tilt tube; 270° for the VL5 wash family and the VL6 and VL7 spot luminaires, and continuous in either direction for the VLM Moving Mirror.

Time — Control of the duration of the change of the variable parameters of VARI❋LITE automated luminaires and other devices in a lighting system.

Timing Channel — A Timing Channel is used in lieu of cue fade rate to determine the time it will take a luminaire to move from one setting to another. For example, a cue in which a luminaire pans from one side of stage to the other may look "steppy" if cue fade rate is used, because of the nature of the DMX512 signal. To overcome this, a timing channel causes the Smart Repeater unit and luminaire to calculate the move in time, effectively smoothing out the movement. To operate properly, the new position and timing channel levels need to be sent to the Smart Repeater in a zero count, (an instant change).

VARI*LITE Color System — The default color palette, available via the Color Soft Select or control keypad, which is based on a numbering system for VARI*LITE colors.

Zero Position — Pan and Tilt values at 50%. Also called "Home Position" or a "50/50" cue or group.

8-Bit DMX The universally accepted lighting control protocol in the entertainment industry. A console uses this protocol to control specific devices in a lighting system. A DMX512 channel packet is eight bits of absolute parameter data. 8-bit refers to the resolution of the signal: 256 step resolution, providing channel values from 0 through 255. A DMX512 data packet is a group of 512 data channels.

16-Bit DMX To smooth out the movement of automated luminaires, the industry has adopted 16-bit DMX. This is not a change to the DMX512 specification, rather a change in the way luminaires and consoles treat DMX512 information. In practice, 16-bit DMX adds a DMX512 channel each to pan and tilt - pan coarse, pan fine, tilt coarse, tilt fine, instead of just pan and tilt. The console and luminaire combine these levels and increase the resolution of pan and tilt from 256 steps to a theoretical maximum 65,536 steps at the console level, resulting in the ability to position the luminaire more accurately.

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